History of an idea 1983-2023:

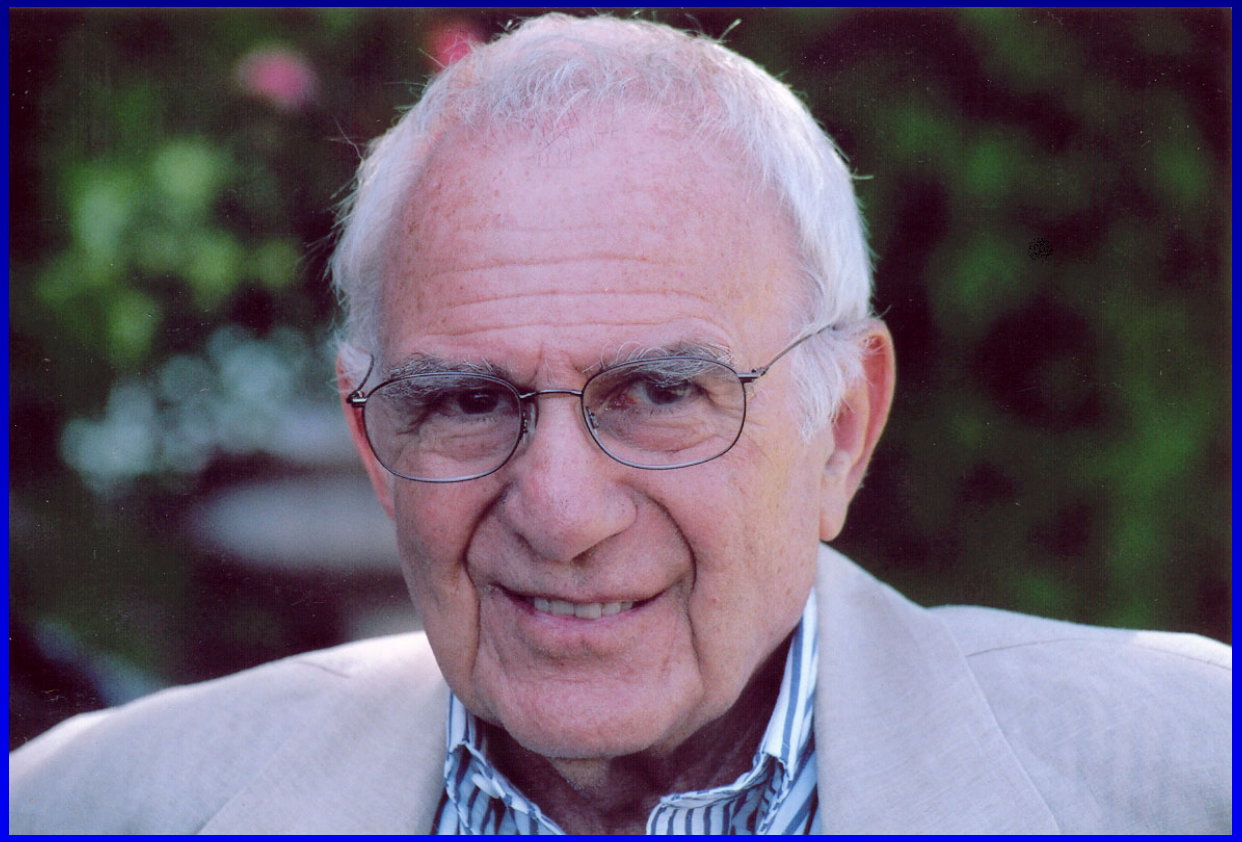
"Adolescence-Limited" and "Life-Course Persistent" antisocial behaviour

Terrie Moffitt, October 2023

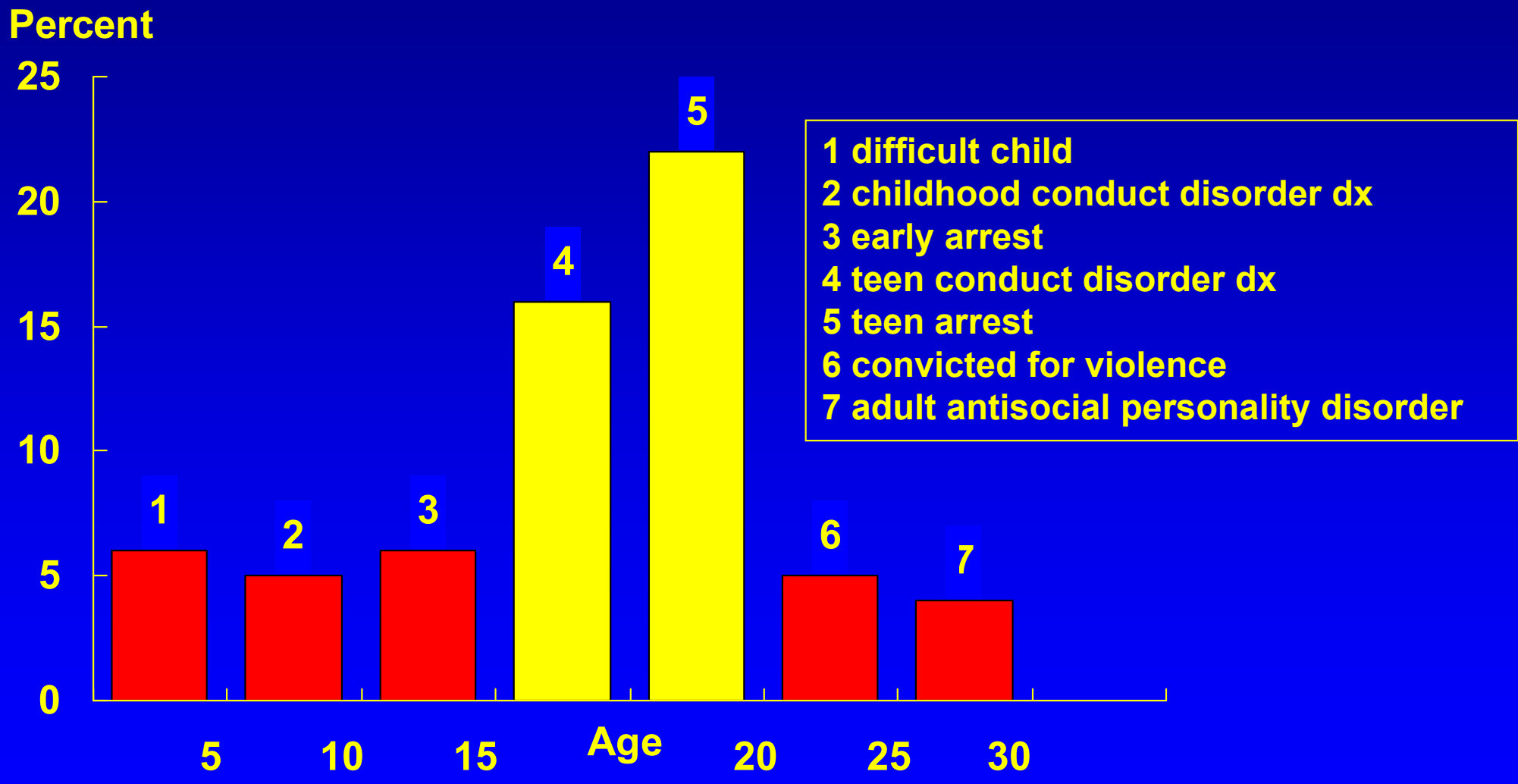
Why speak with your Board of Parole Hearings?

- Long road from research to application in clinical and judicial practice
- Is this research being used?
- Is use a close match to the original science?

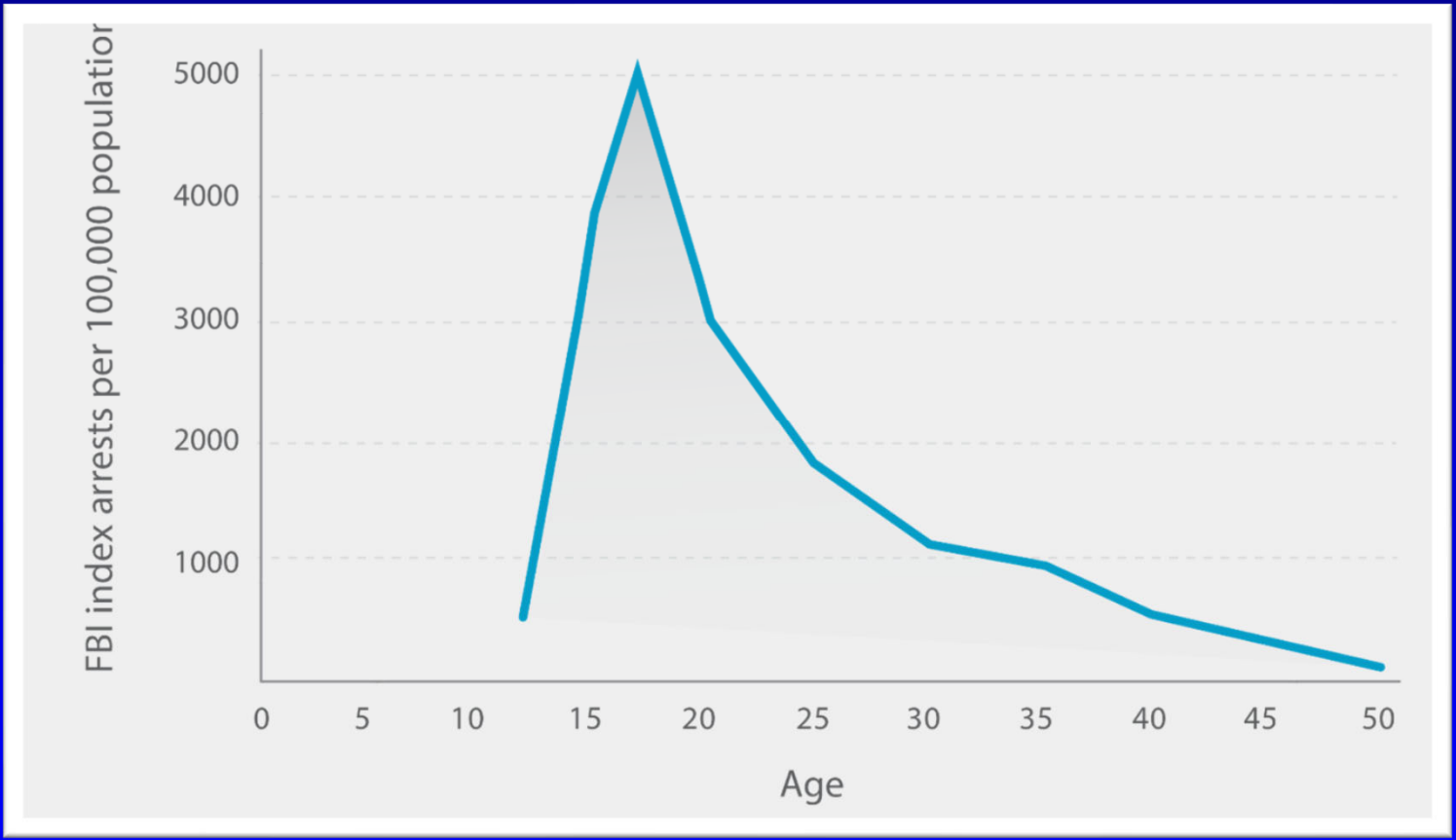
Sarnoff Mednick

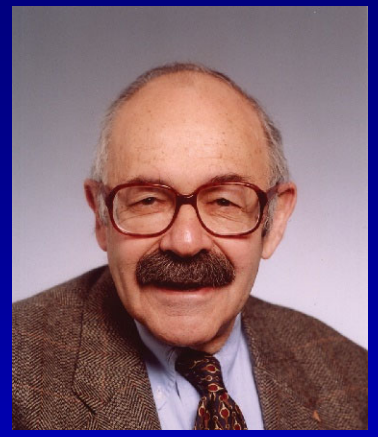


1980's: What psychology knew: The cross-sectional prevalence of male antisocial behaviour



1980's: The curve of official crimes over age

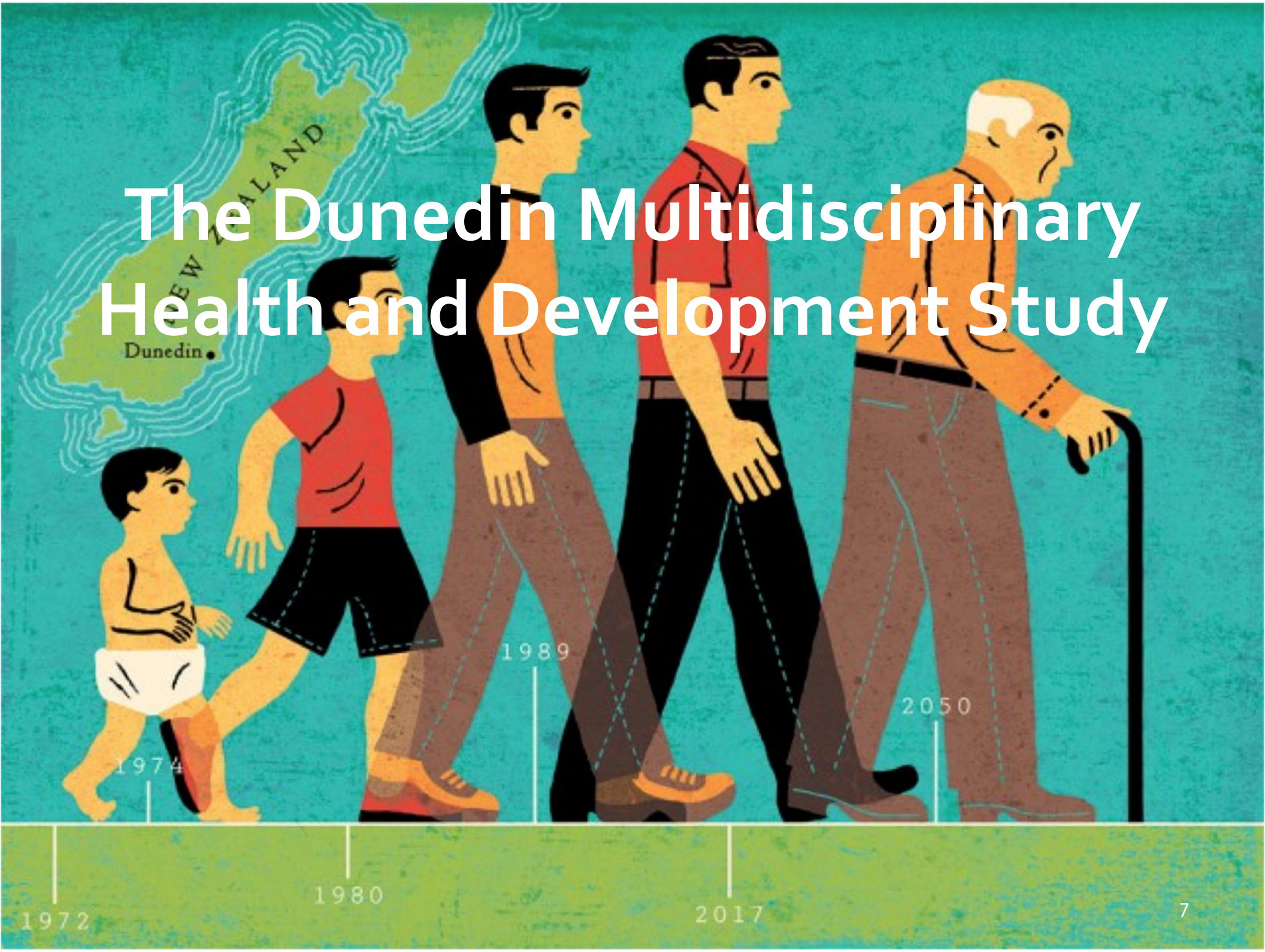




Al Blumstein,
Carnegie Mellon

David Farrington,
Cambridge Univ.


Dunedin, New Zealand



The Dunedin Multidisciplinary Health and Development Study

Dunedin Study Design

Age	Year	Number	Percent*
Birth	1972-73		
3	1975-76	1037	**100%**
5	1977-78	991	96
7	1979-80	954	92
9	1981-82	955	92
11	1983-84	925	90
13	1985-86	850	82
15	1987-88	976	95
18	1990-91	993	97
21	1993-94	992	97
26	1998-99	980	96
32	2004-05	972	96
38	**2010-12**	**961**	**95**
45	**2017-2019**	**938**	**94%**
52	**2024-2026**	**??**	**??**

* Percent assessed, of those who were alive at each age.

Dunedin Study Design

Birth to age 11

Age	Year	Number	Percent*
Birth	1972-73		
3	**1975-76**	**1037**	**100%**
5	**1977-78**	**991**	**96**
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Dunedin Phase 13: 1985

Dunedin Study Design

Age	Year	Number	Percent*
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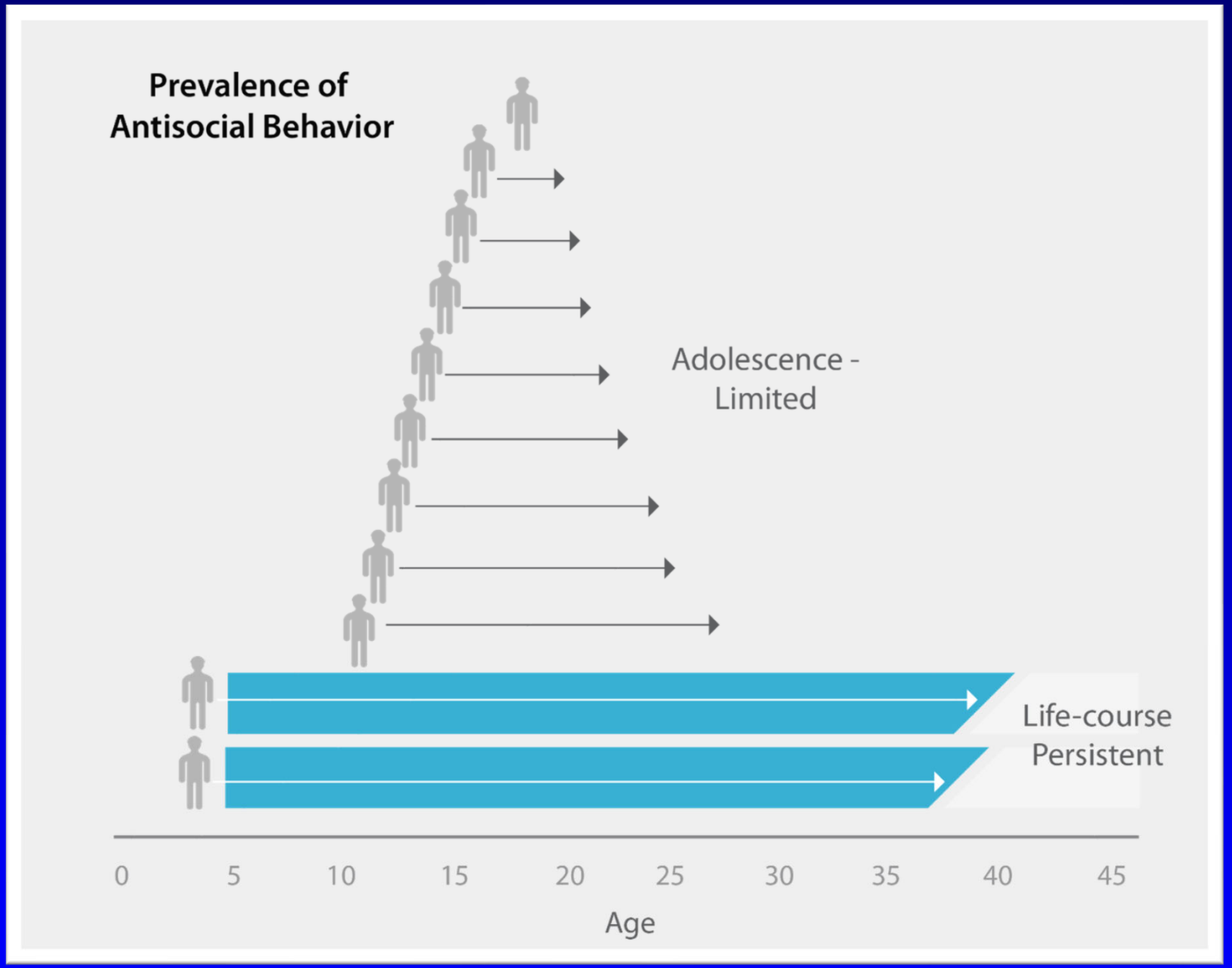
ages 13 and 15



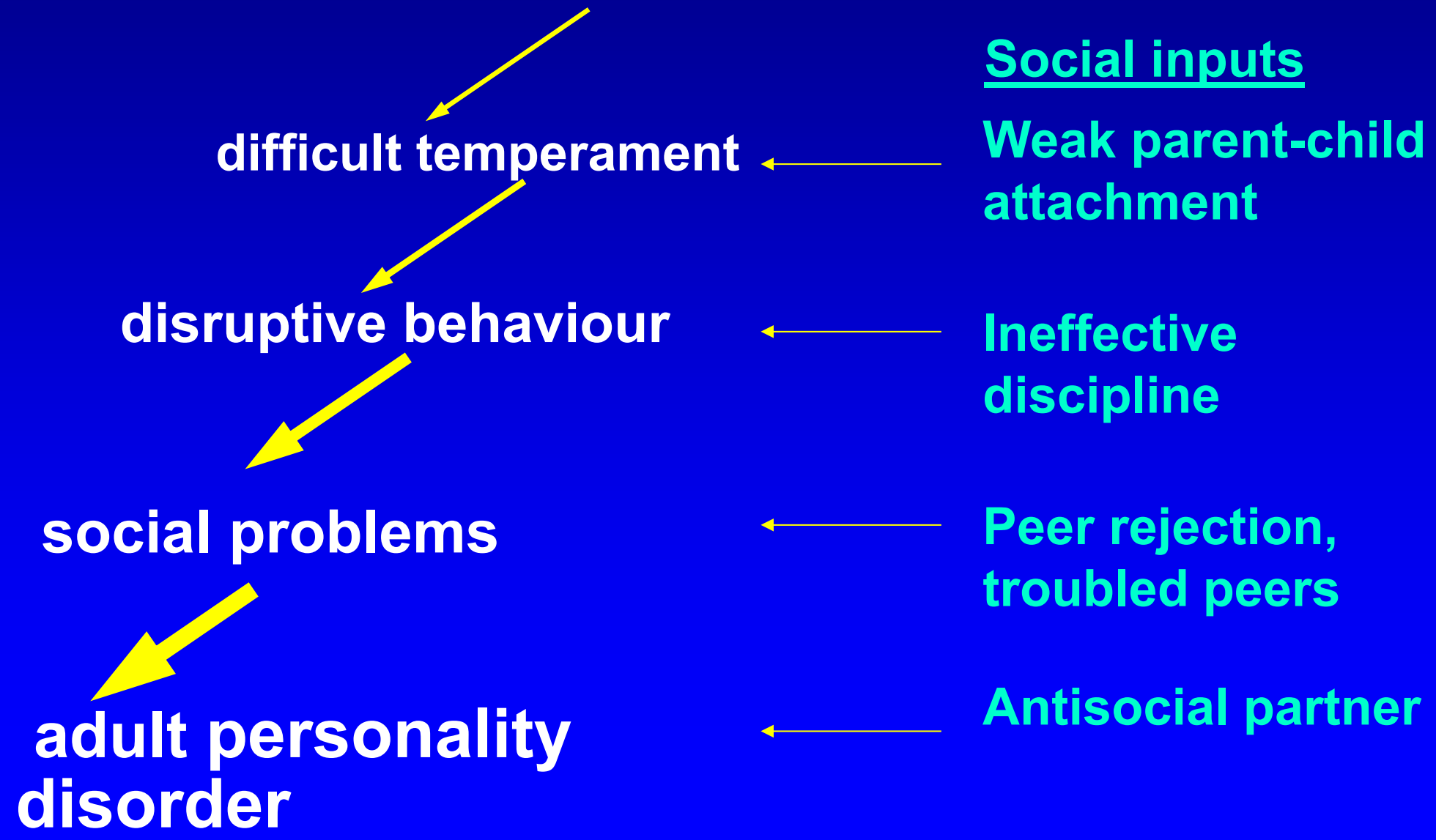
Moffitt, Child Development 1990

Moffitt, Terrie E., 1993,
Adolescence-Limited and Life-Course
Persistent Antisocial Behavior:
A Developmental Taxonomy.
Psychological Review 100:674-701.

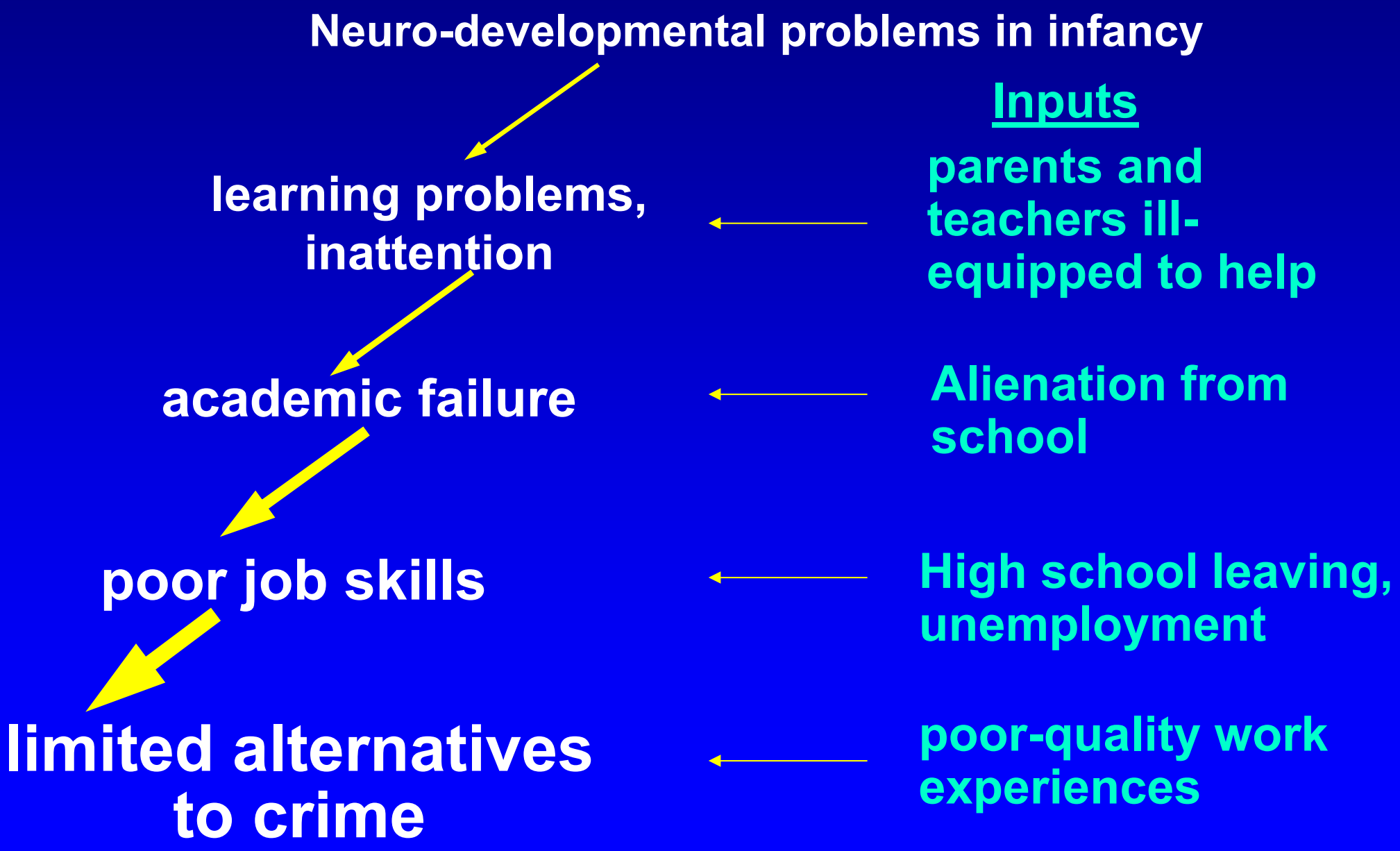
Now cited > 13,500 times

1993 Lifecourse Persistent Theory: Social path

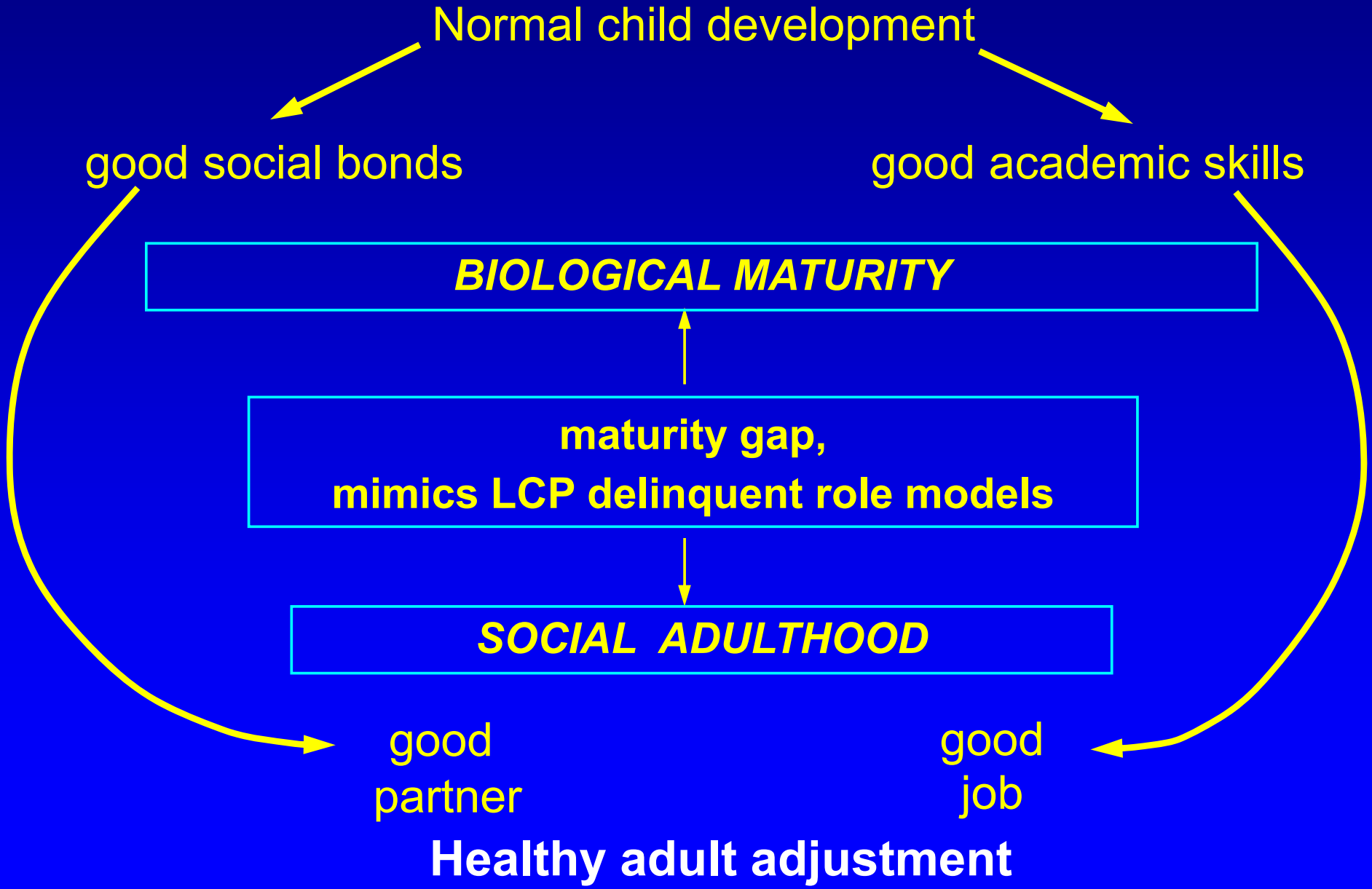
Neuro-developmental problems in infancy



1993 LCP Theory path 2: Academic path



1993 Adolescence-Limited Theory



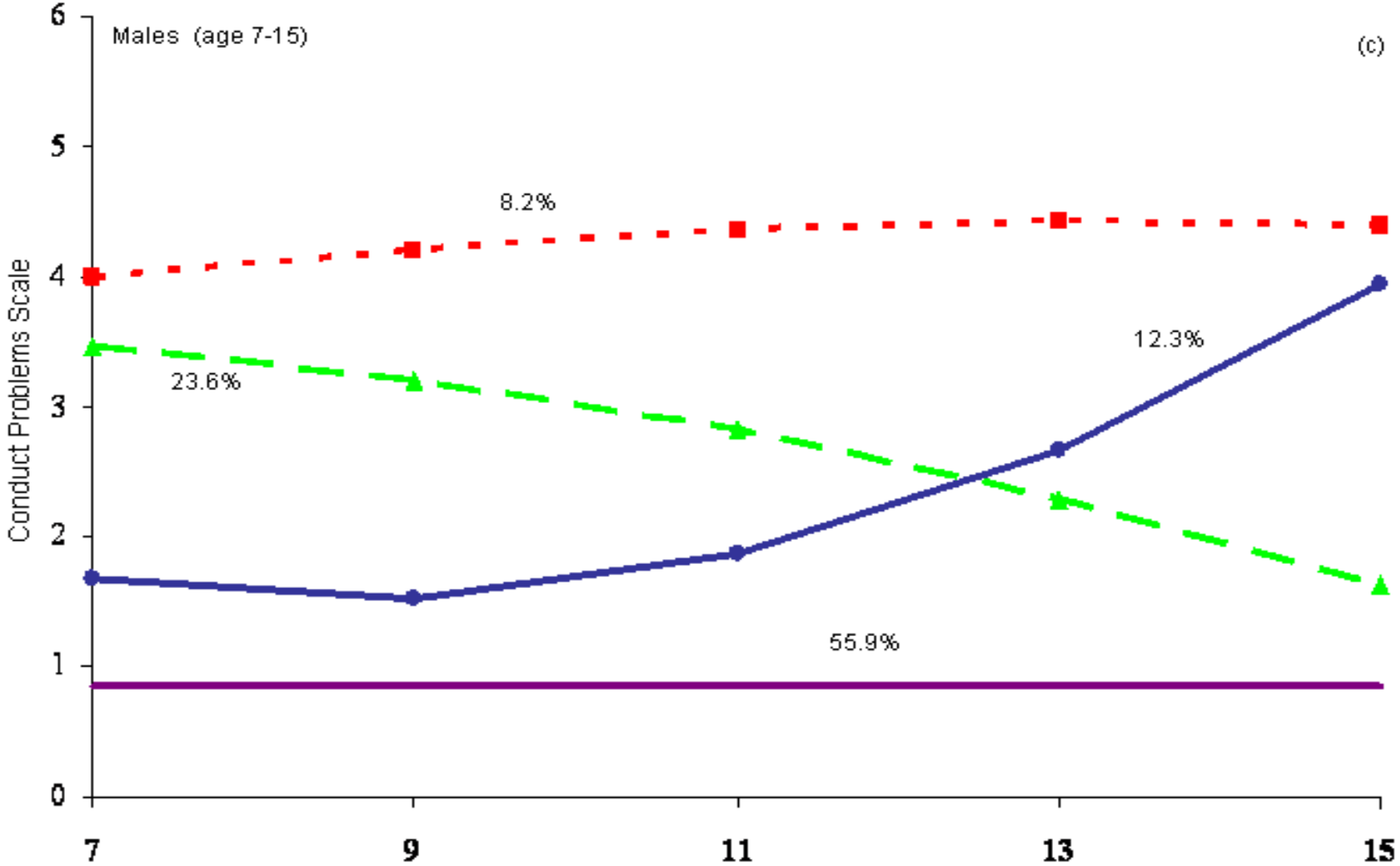
Measurement of Antisocial Behaviours

Fighting, Bullying, Telling Lies, Stealing, Truancy, Destroying Property.

Ages 7, 9, 11, 13, 15

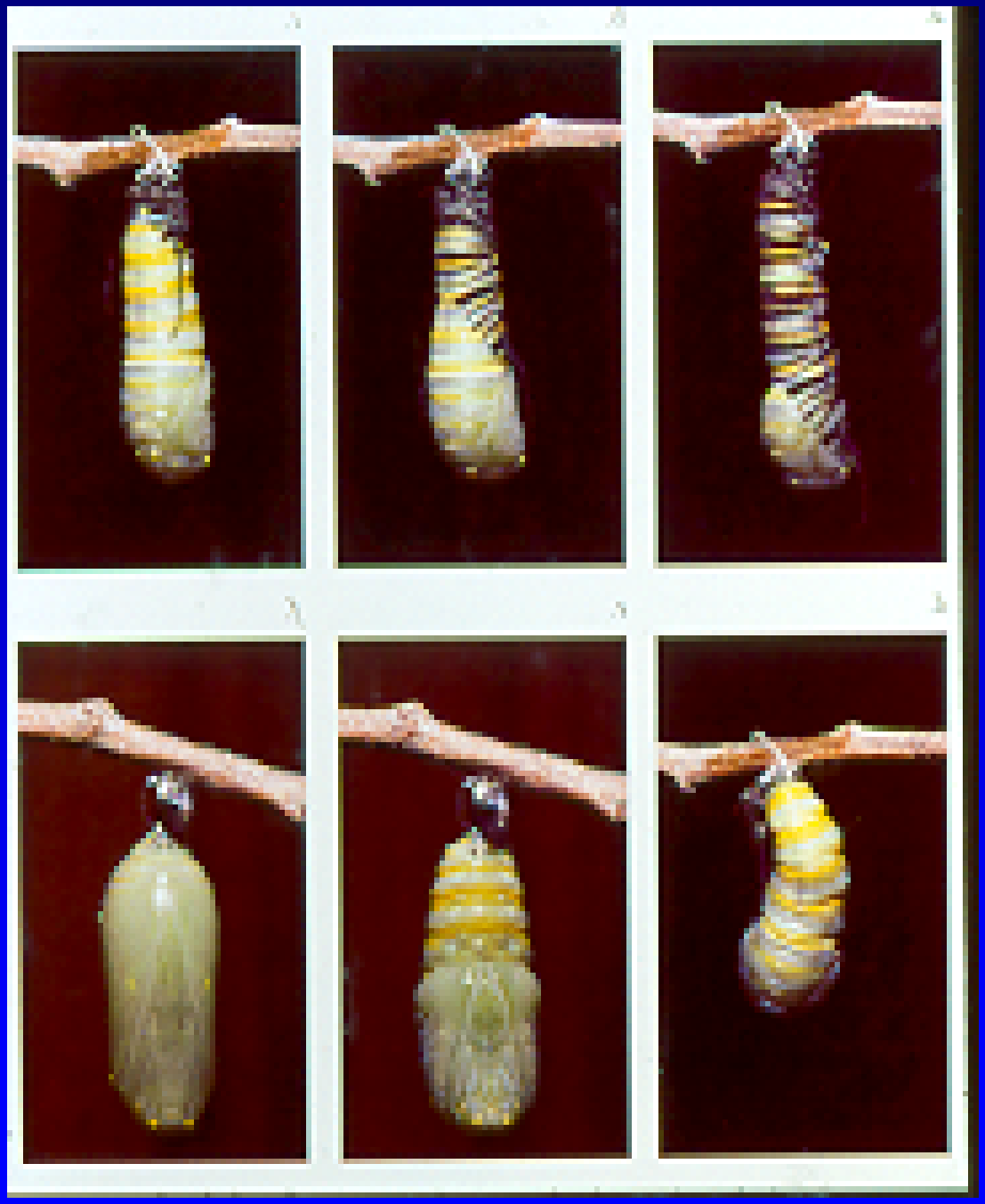
Teacher, Mother and Self-Reports

Trajectory analysis to age 15



Admiral

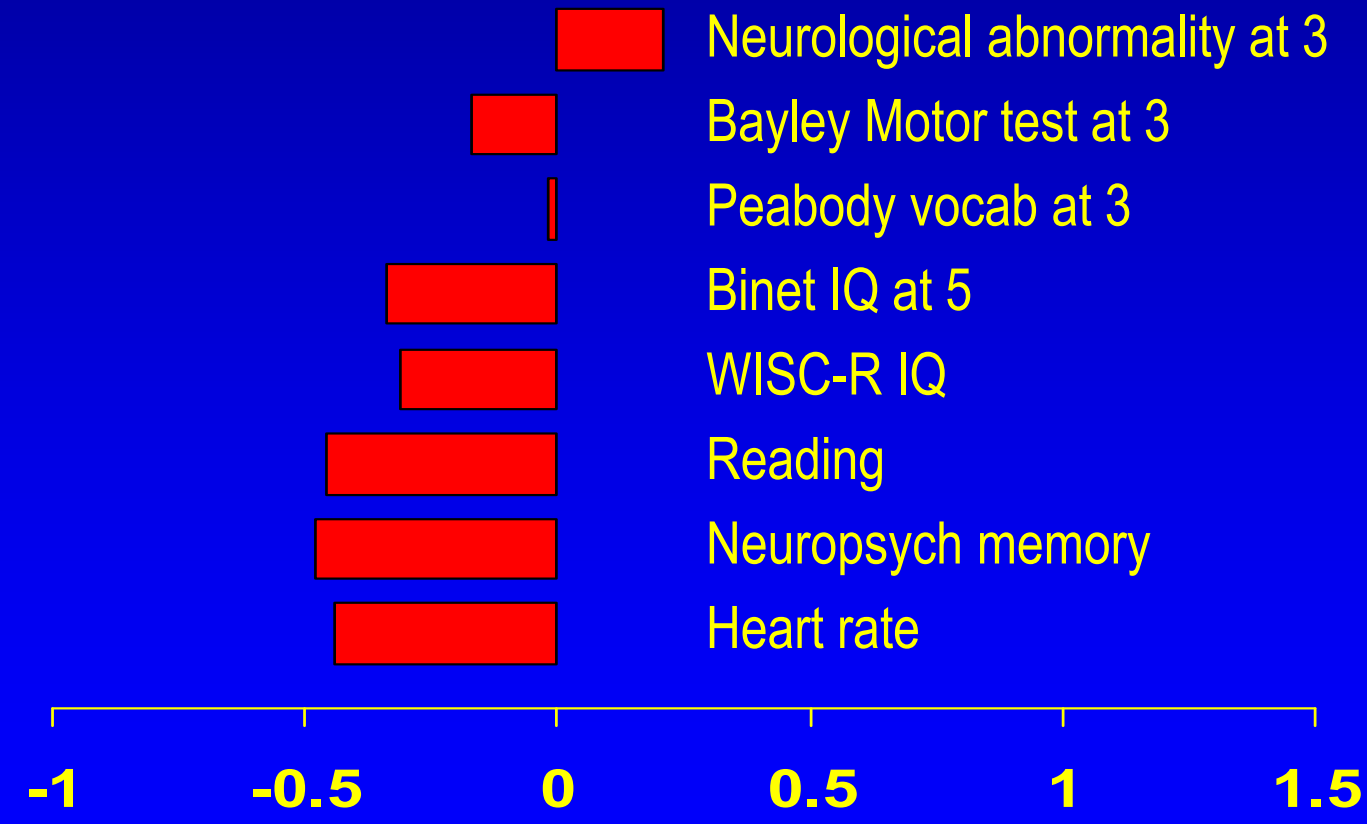
Monarch



Studying childhoods of boys on the LCP and AL paths

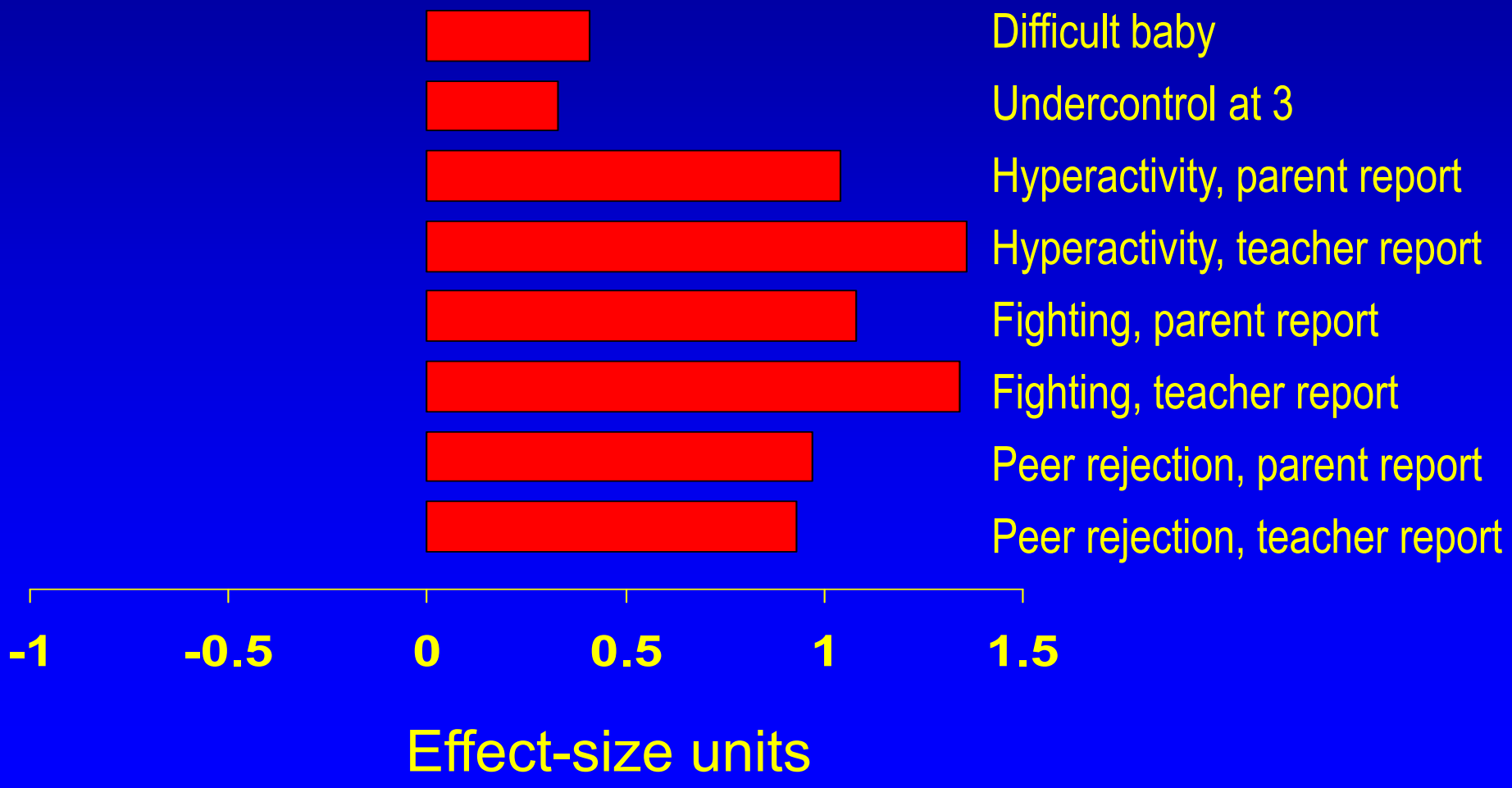
- Graphs scaled so the population norm is the zero midpoint
- Compared each trajectory group to the average boy
- Effect sizes for group differences shown on graphs
- ~.2 = small
- ~.5 = medium
- ~.8 = a large

LCP-path males
Neuro-developmental risks, age 3-11

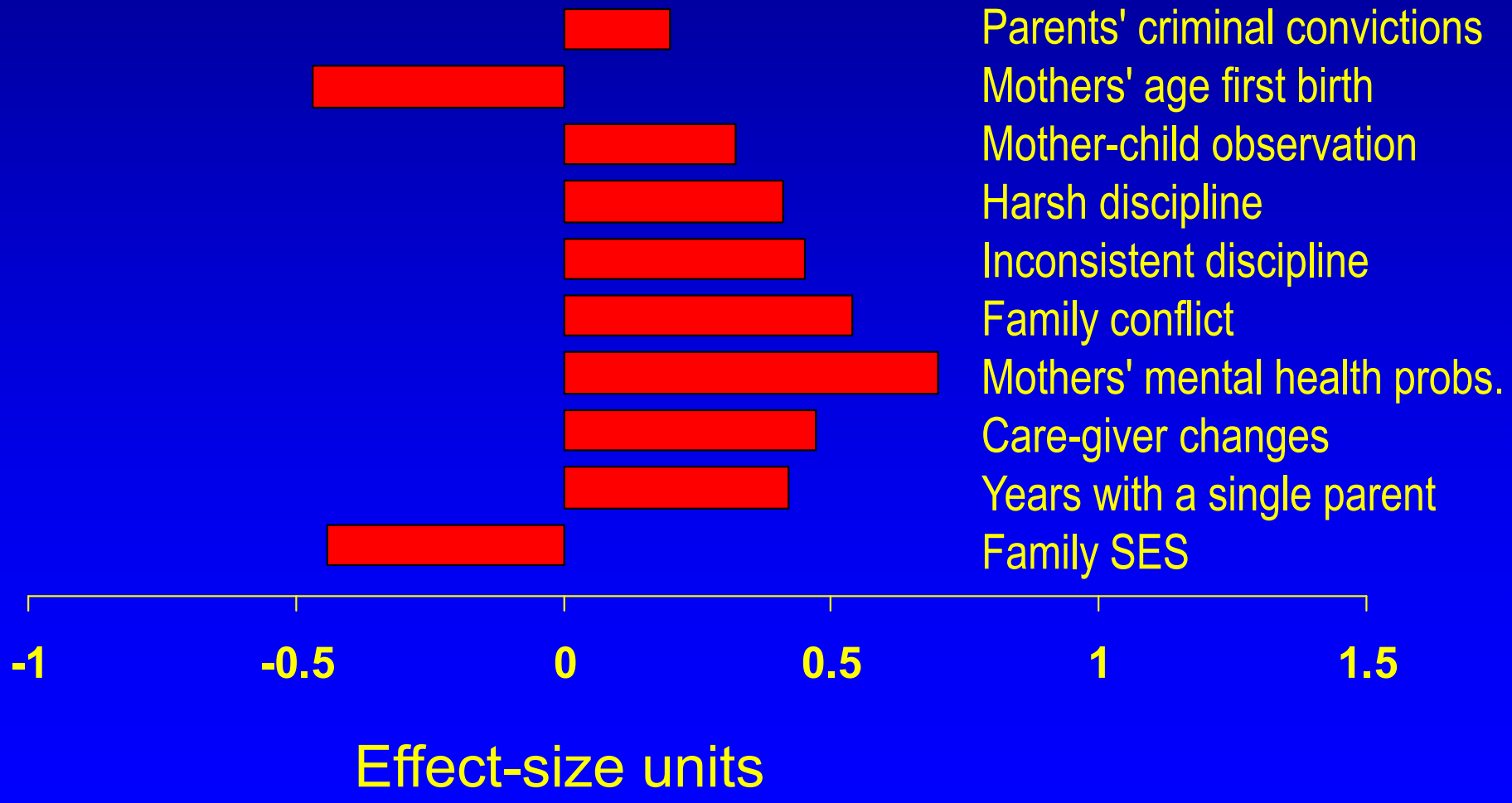


Effect-size units, zero = the average boy

LCP-path males
Temperament-Behaviour Risks, age 3-11



LCP-path males
Parenting Risk Factors, age 3-11



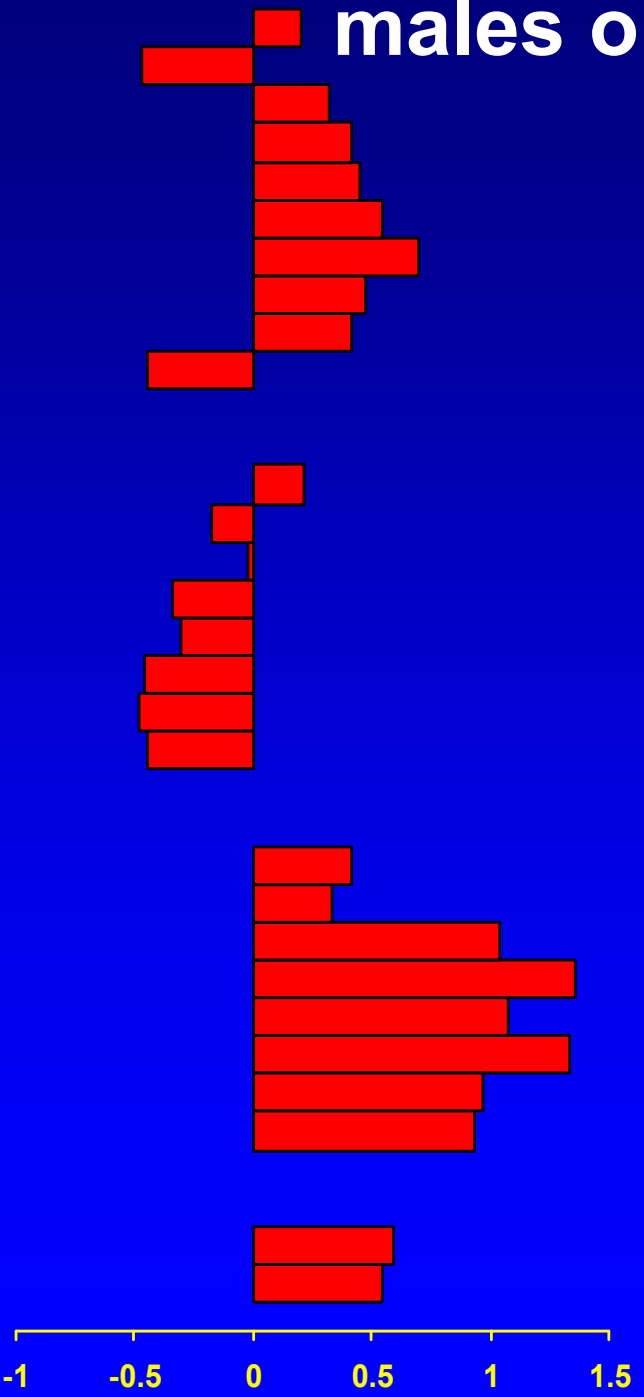
SUMMARY: childhood of males on LCP path

PARENTING RISK FACTORS
Parents' criminal convictions
Mothers' age first birth
Mother-child observation
Harsh discipline
Inconsistent discipline
Family conflict
Mothers' mental health probs.
Care-giver changes
Years with a single parent
Family SES

NEURO-COGNITIVE RISK
Neurological abnormality at 3
Bayley Motor test at 3
Peabody vocab at 3
Binet IQ at 5
WISC-R IQ
Reading
Neuropsych memory
Heart rate

TEMPERAMENT - BEHAVIOUR RISK
Difficult at 2
Undercontrol at 3
Hyperactivity, parent report
Hyperactivity, teacher report
Fighting, parent report
Fighting, teacher report
Peer rejection, parent report
Peer rejection, teacher report

PEER DELIQUENCY
Delinquent peers at 13
Delinquent peers at 18



Moffitt et al., 2001,

Dev & Psychopathology

SUMMARY: childhood of males on AL path

PARENTING RISK FACTORS
Parents' criminal convictions
Mothers' age first birth
Mother-child observation
Harsh discipline
Inconsistent discipline
Family conflict
Mothers' mental health probs.
Care-giver changes
Years with a single parent
Family SES

NEURO-COGNITIVE RISK
Neurological abnormality at 3
Bayley Motor test at 3
Peabody vocab at 3
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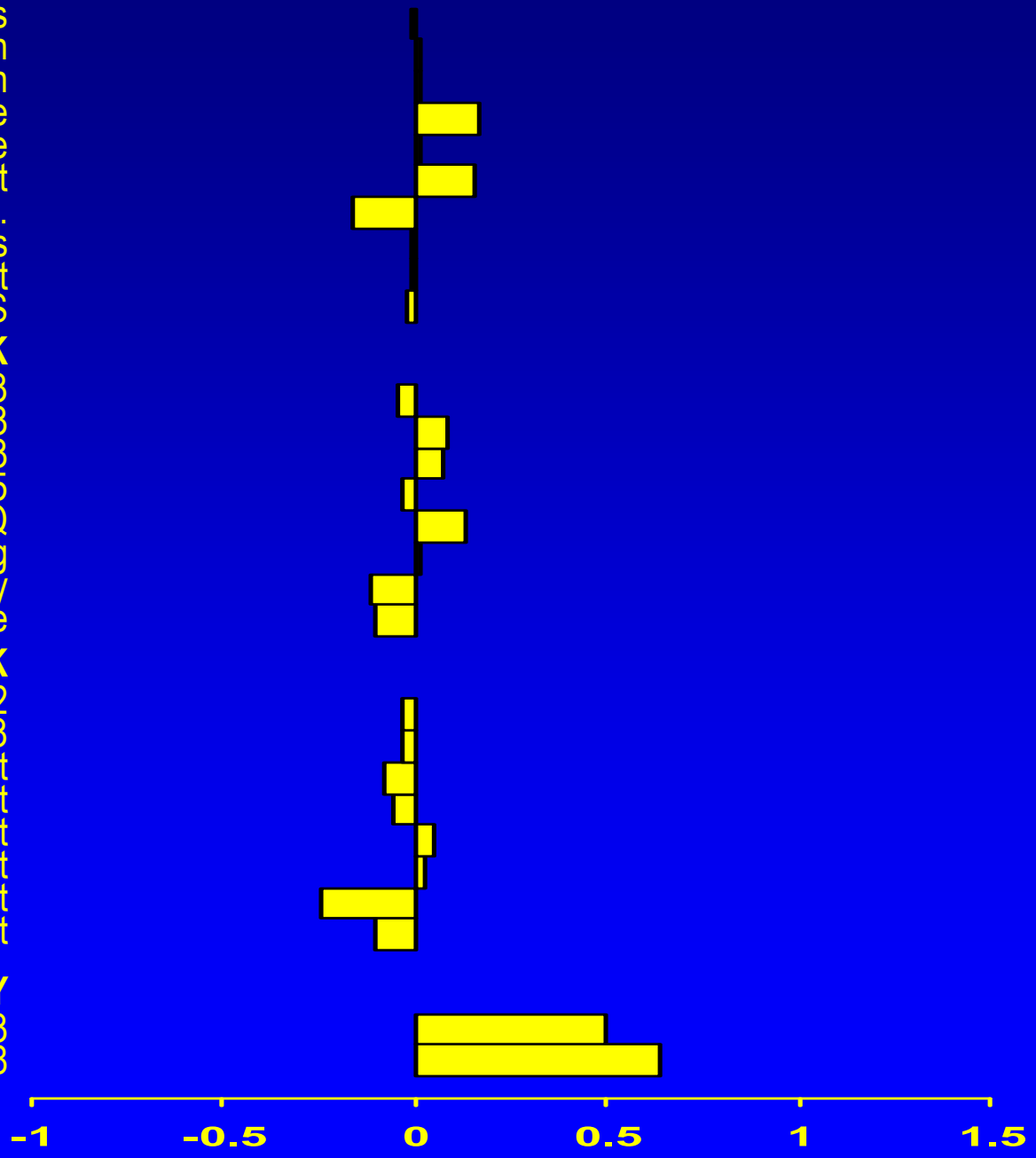
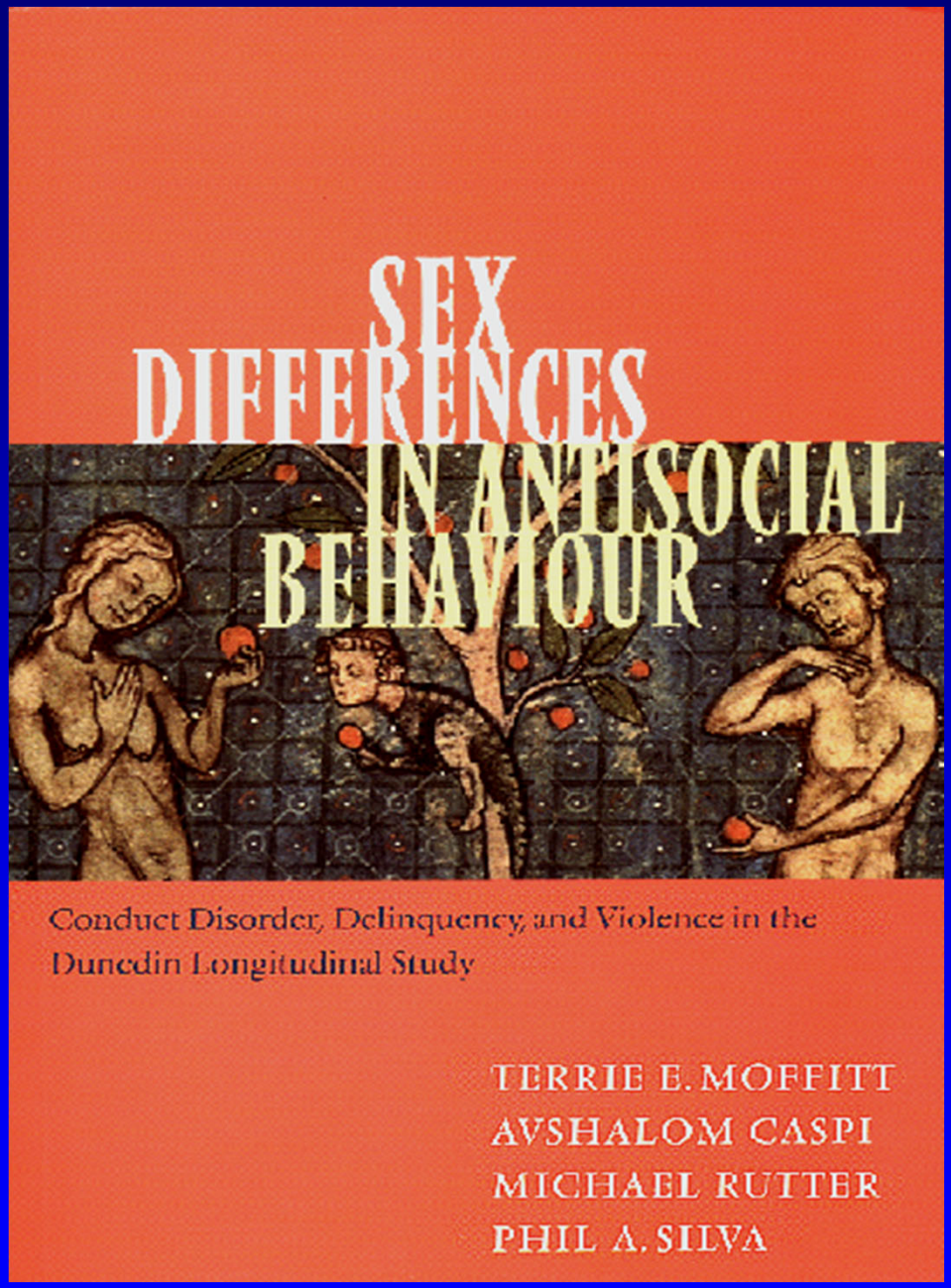


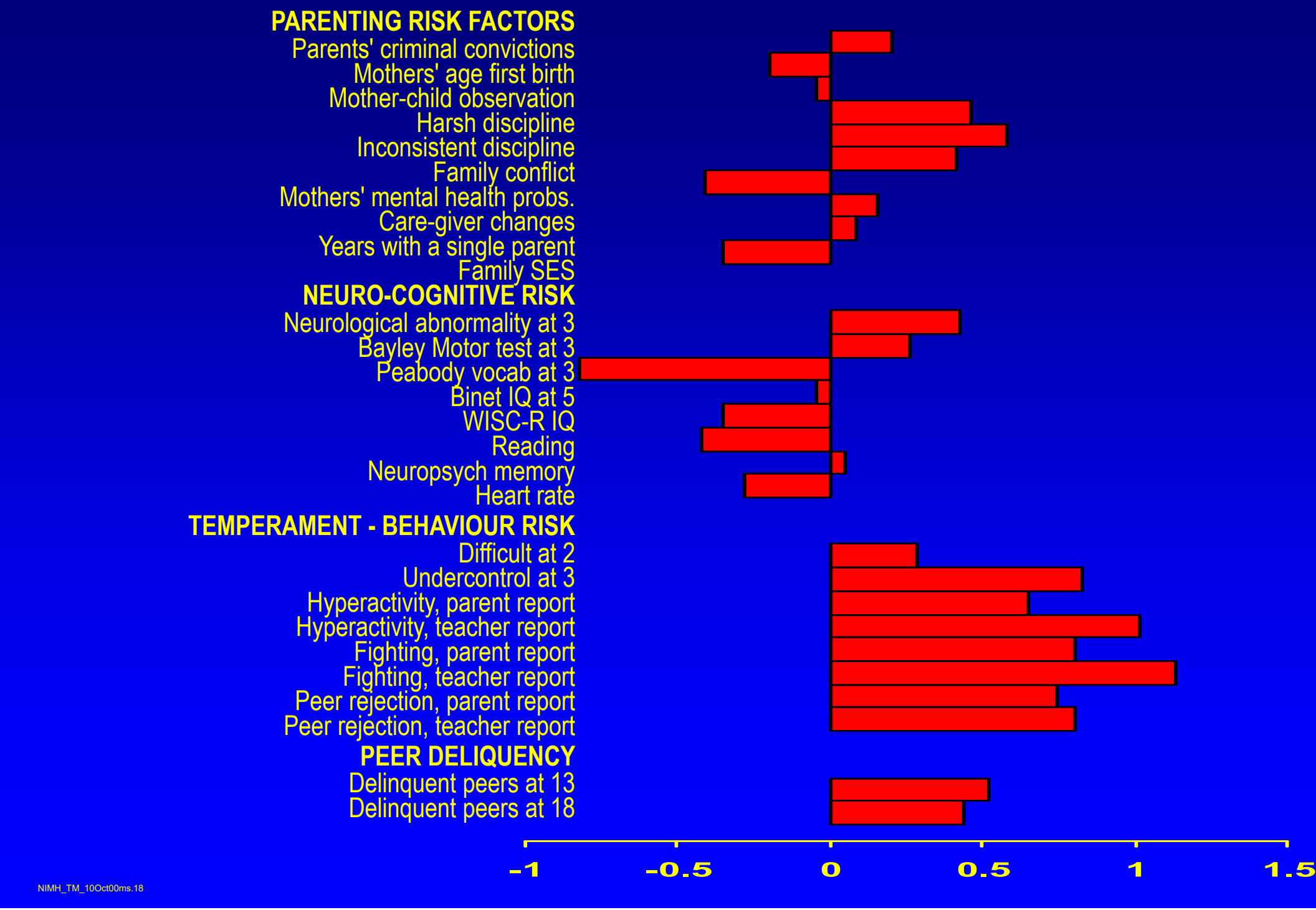


Cambridge Univ. Press, 2001

Life-course persistent: More common in males

Adolescence-Limited: Equal male:female ratio

Childhood of the few girls on the LCP path



Childhood of girls, most on the AL path

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Inconsistent discipline
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Mothers' mental health probs.
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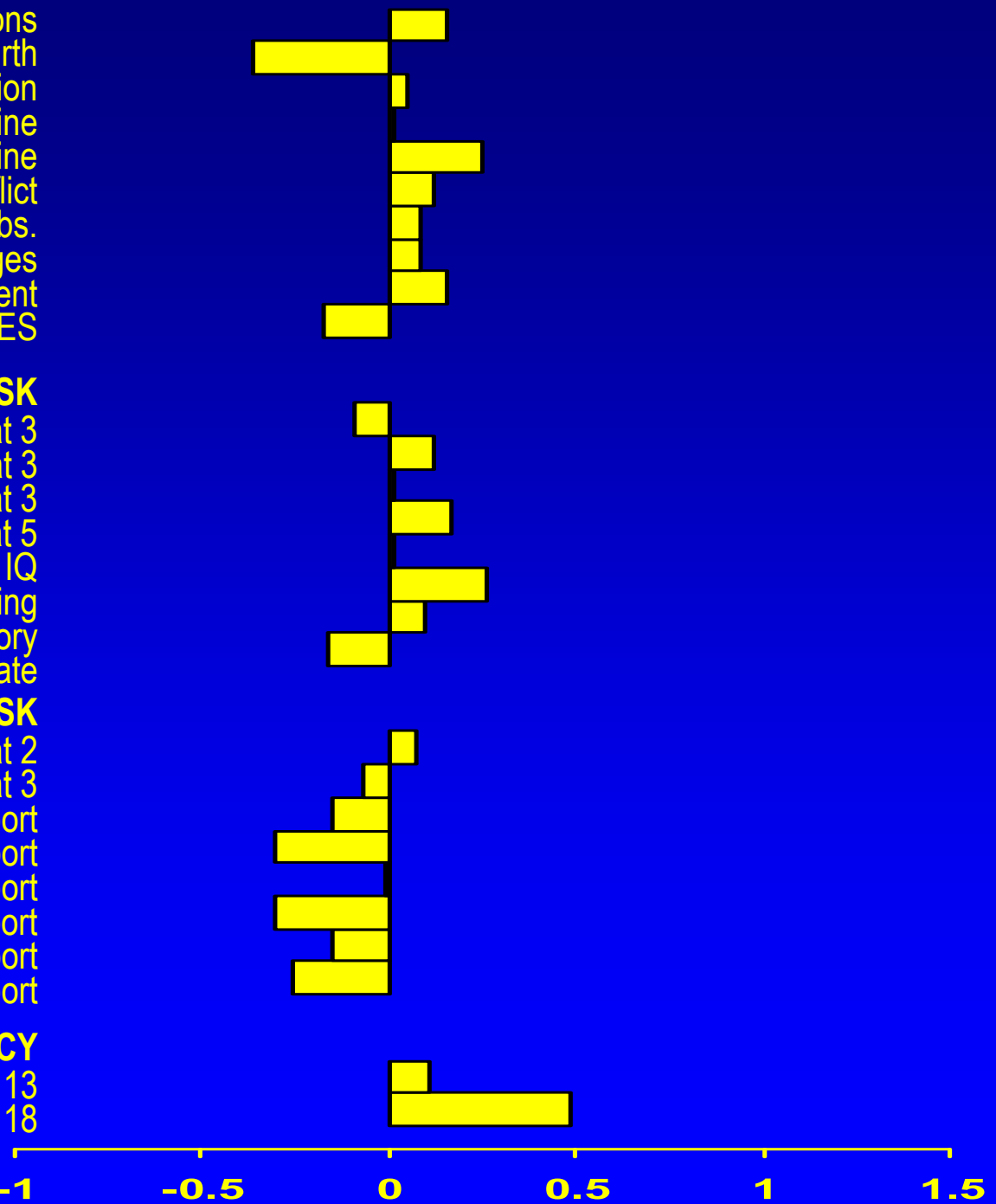
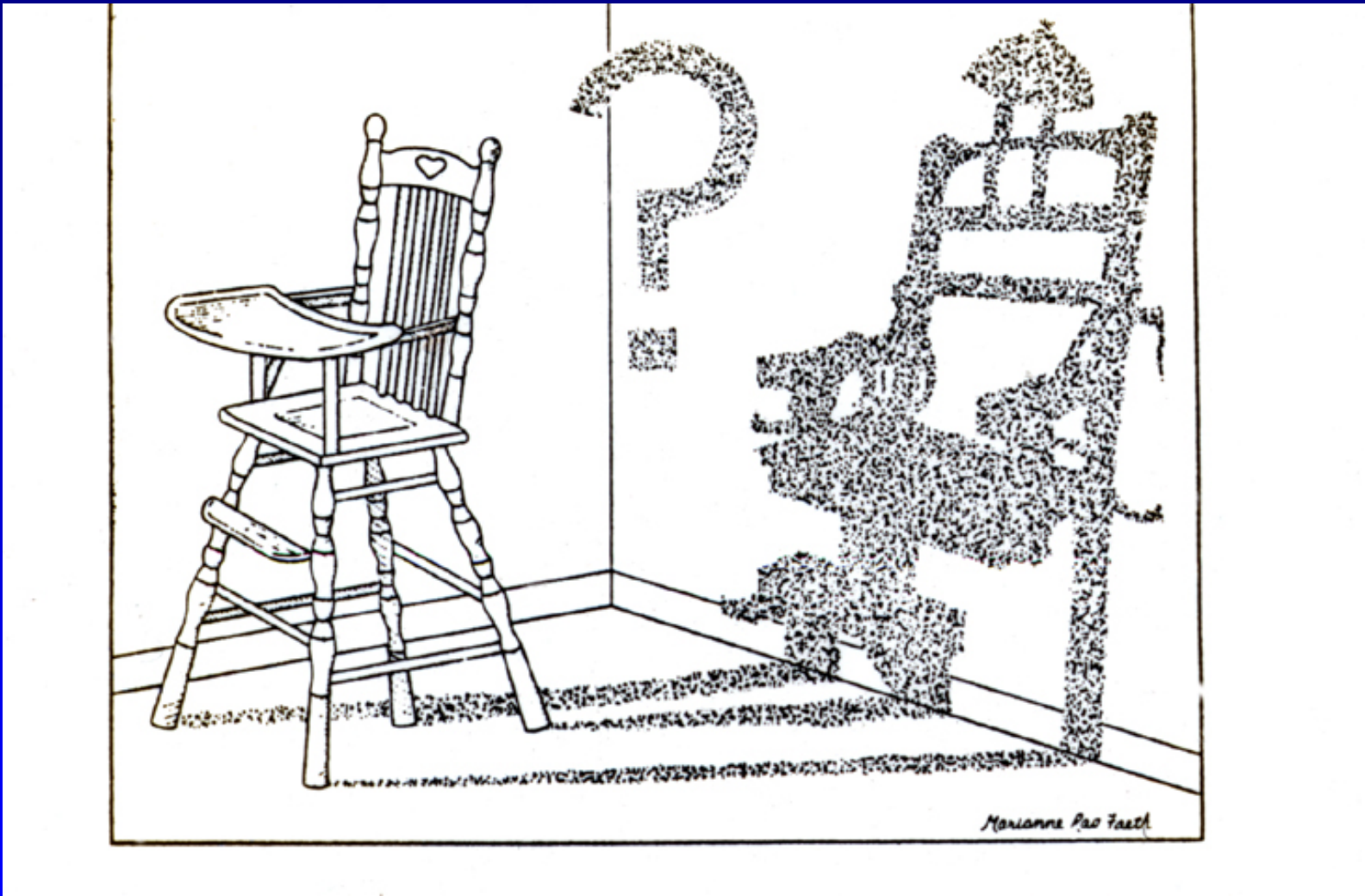


Do LCP & AL have different adult outcomes?



Washington Post, 1994

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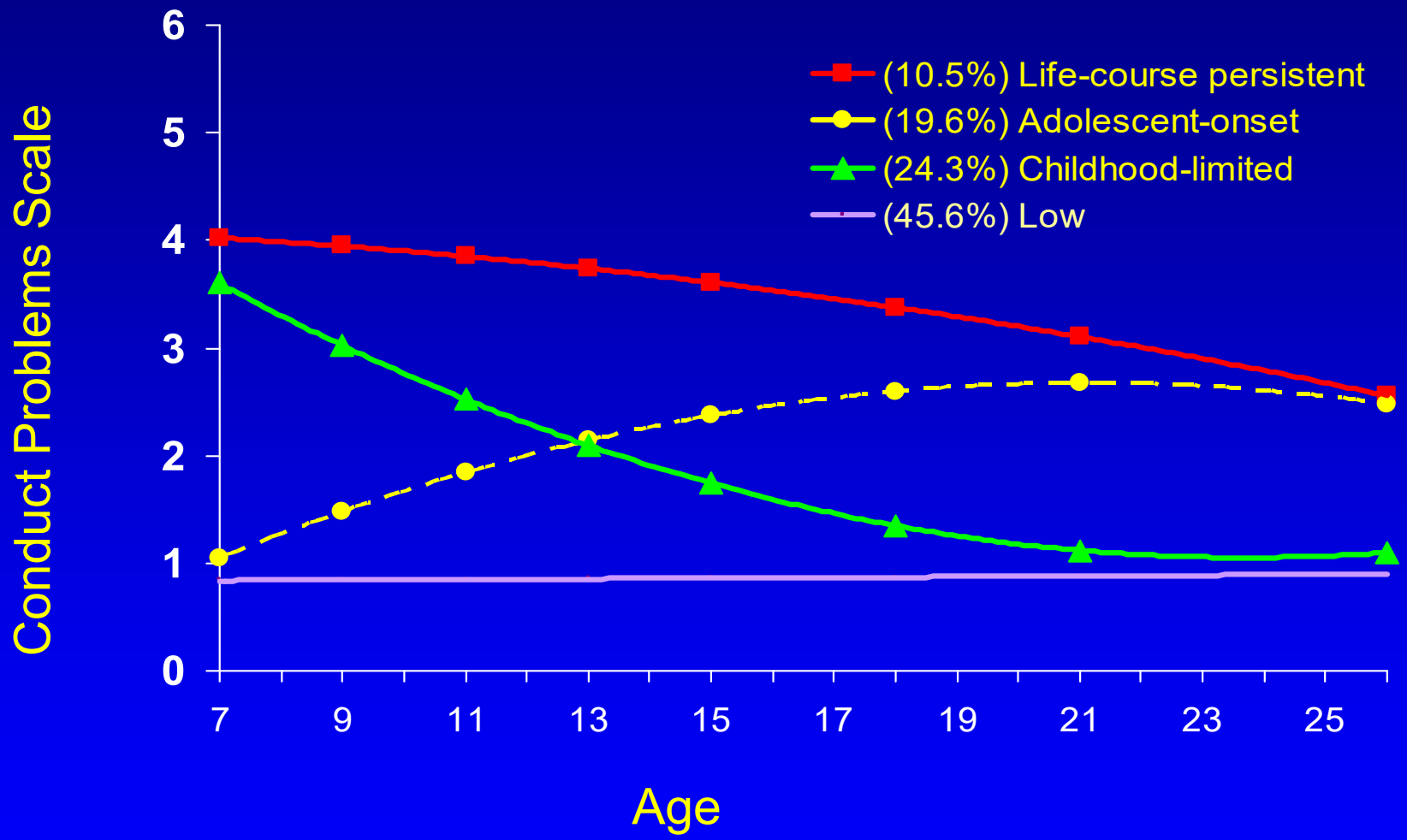
52	2024-2026	??	??

Age 18, 21, 26

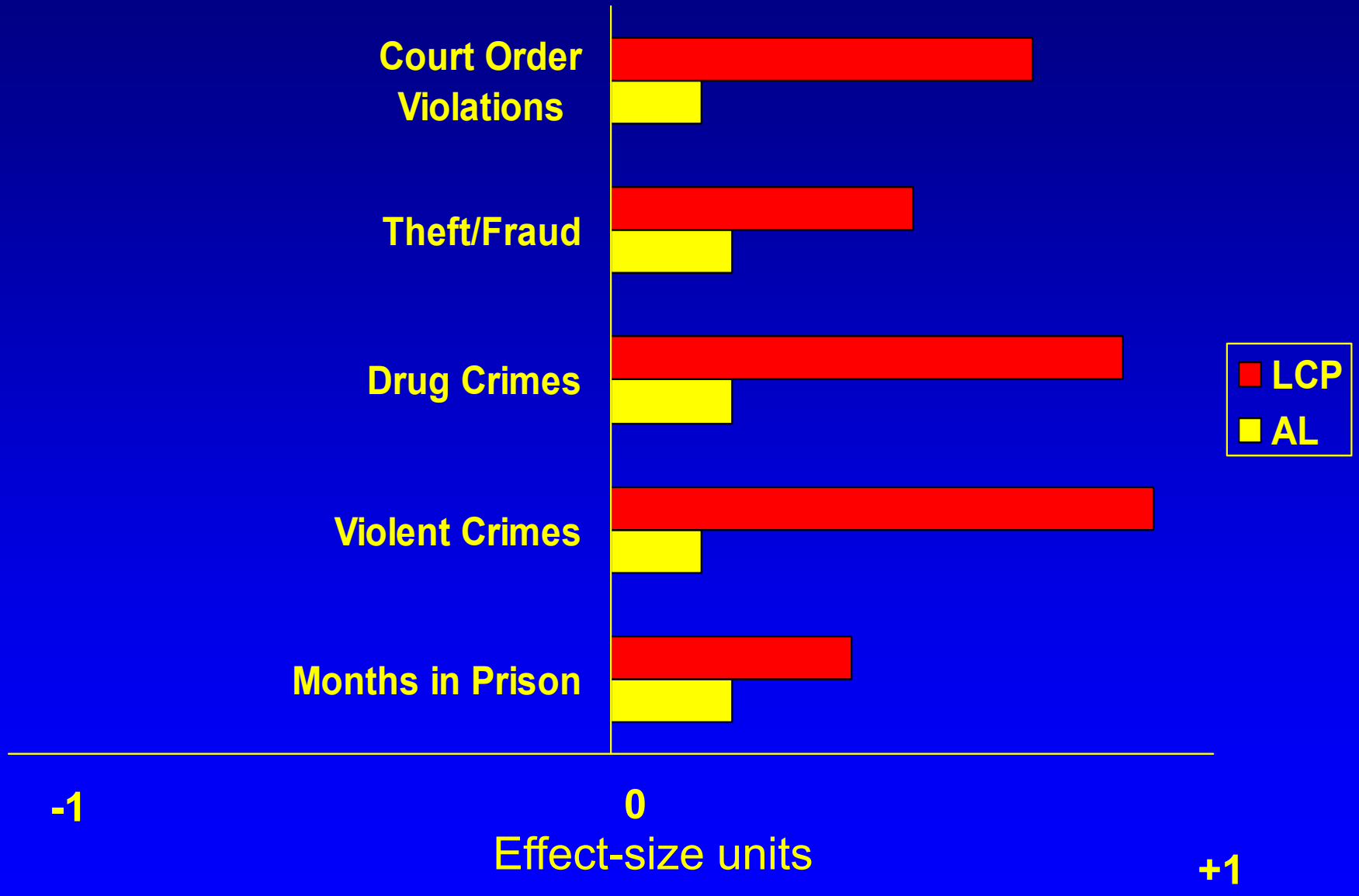
Candice Odgers, UC Irvine

Trajectories age 7 to 26 (males and females)

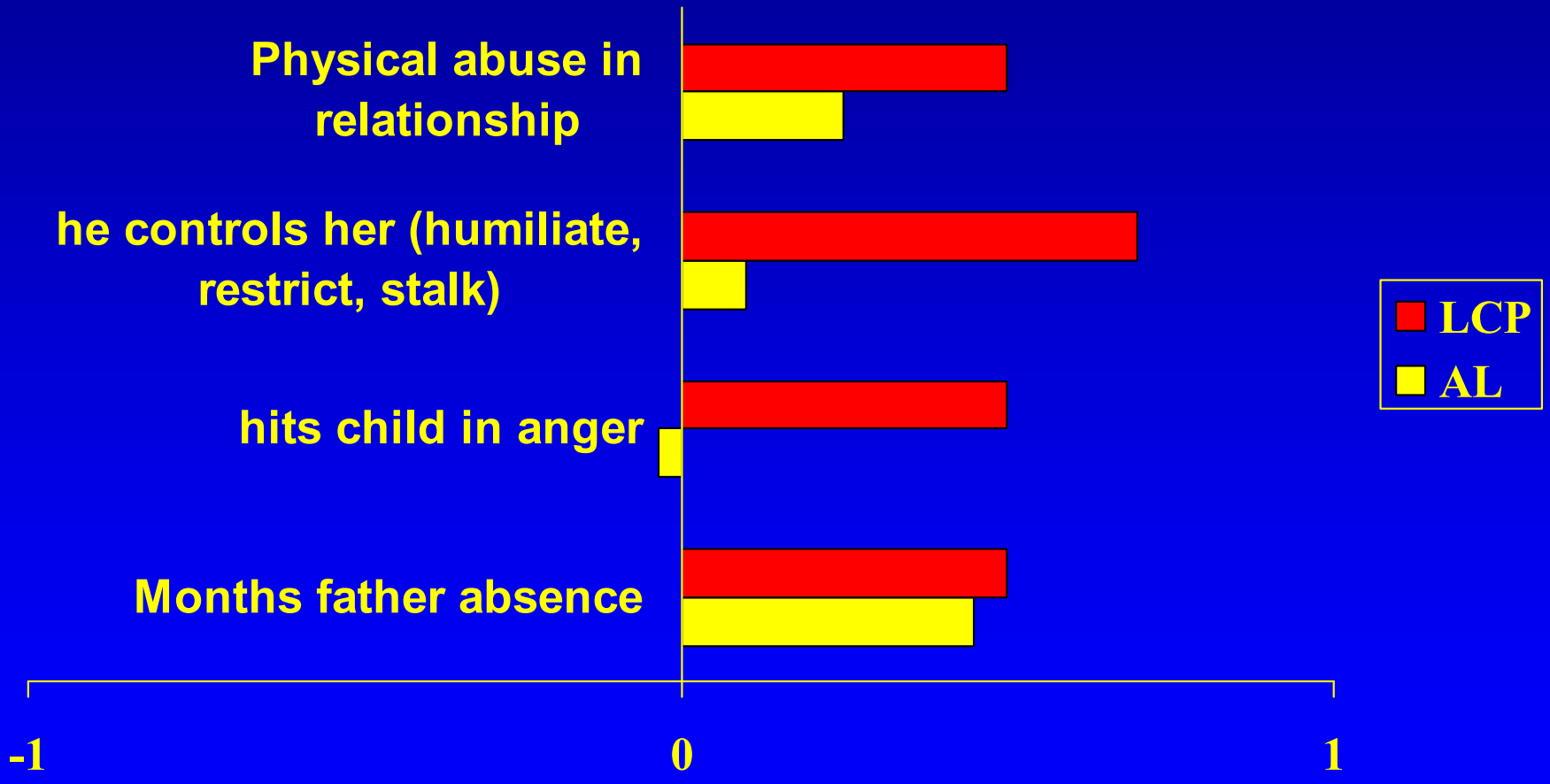


Odgers, Moffitt, Caspi, D&P, *2008*

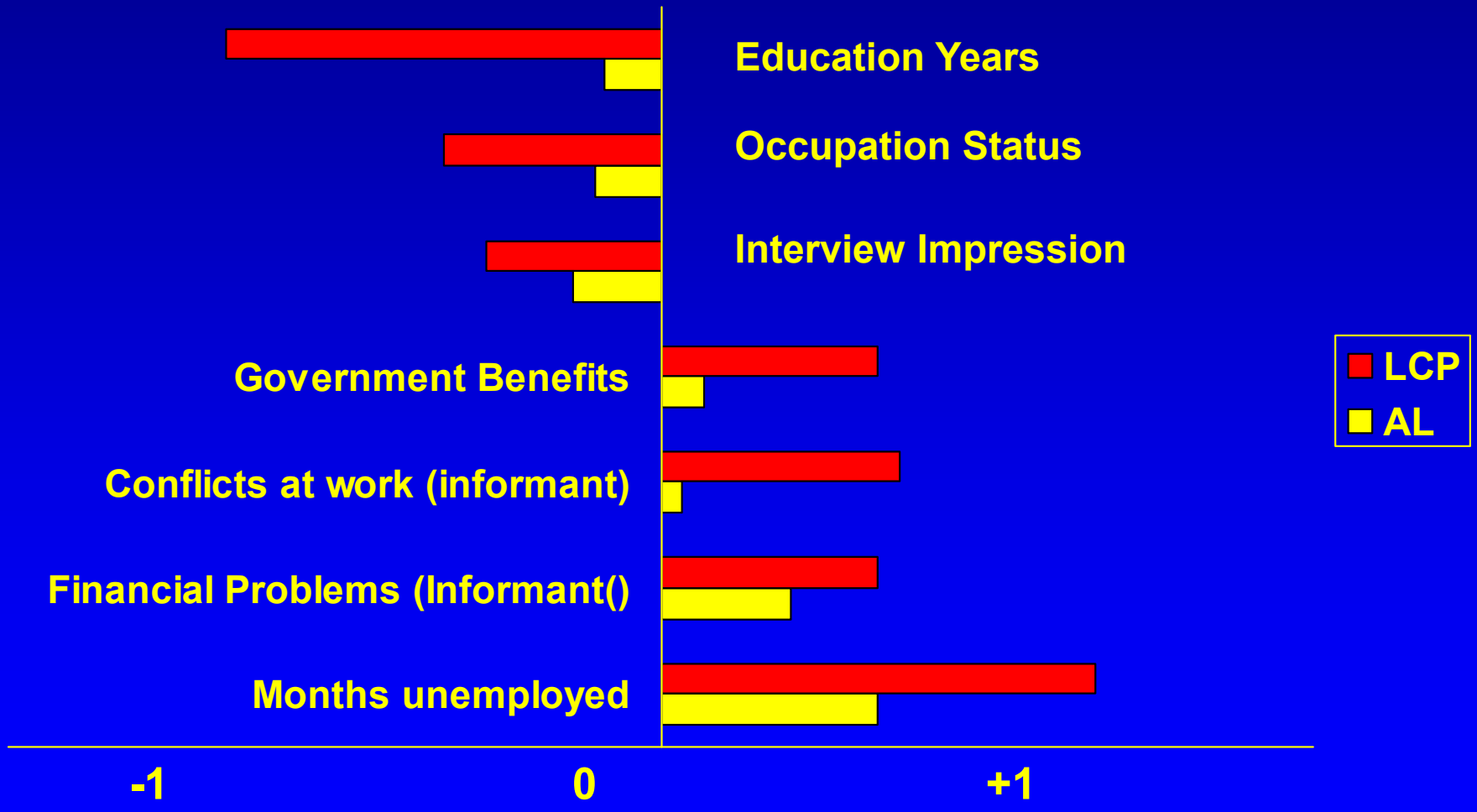
Convictions in adult court age 18-26



Family problems at age 26



Work problems at age 26



Conduct-problem boys who did not become offenders: Magic key to protective factors?

- Were they really recoveries?

The childhood-limited group's adult outcomes…

- Social phobia
- Agoraphobia
- No partner
- No children
- Neuroticism
- Introversion
- Welfare dependent
- Low education
- Lowest SES jobs
- Financial difficulties
- 1/3 convicted

Childhood-limited conduct disorder: not a key to protective factors

Lee Robins, *Deviant Children Grown Up* (1966):

"Half of boys with conduct disorder do not develop antisocial personality disorder as adults….

but most of them develop other adjustment problems."

David Farrington et al. (1988):

"…there were no real adult success stories."

American Psychiatric Assocation Diagnostic and Statistical Manual

1994

Clinician's dilemma: Childhood-limited or Life-course Persistent?

2006 Dunedin Family Health History Study:

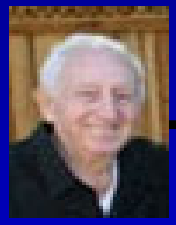
Informants

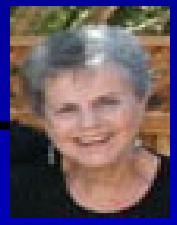
Study member

Father

Mother

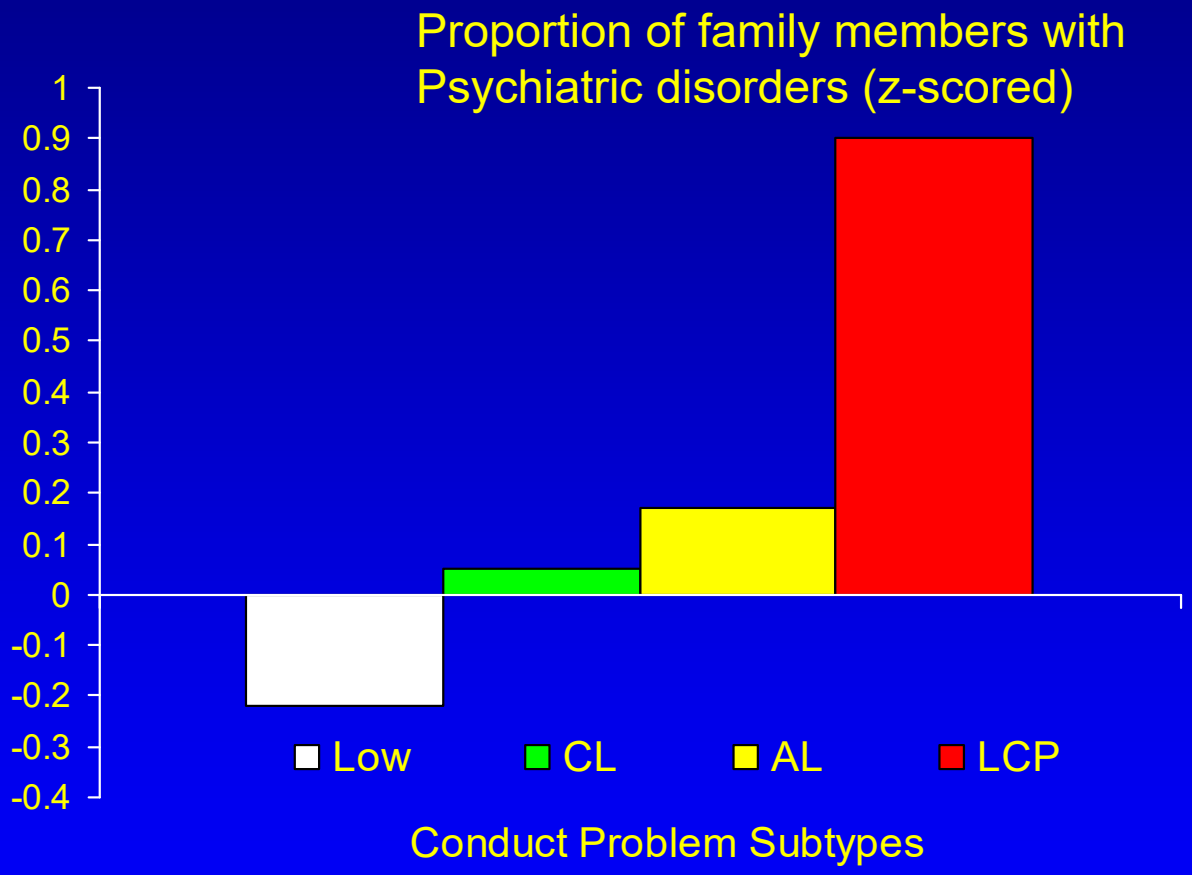
Family members





7-16 members per each of 1000 families,
> 8,000 individuals

Family psychiatric history distinguished children on the life-course-persistent path



Odgers, Moffitt et al. (2007) J. Am Academy Child Adolesc Psychiatry

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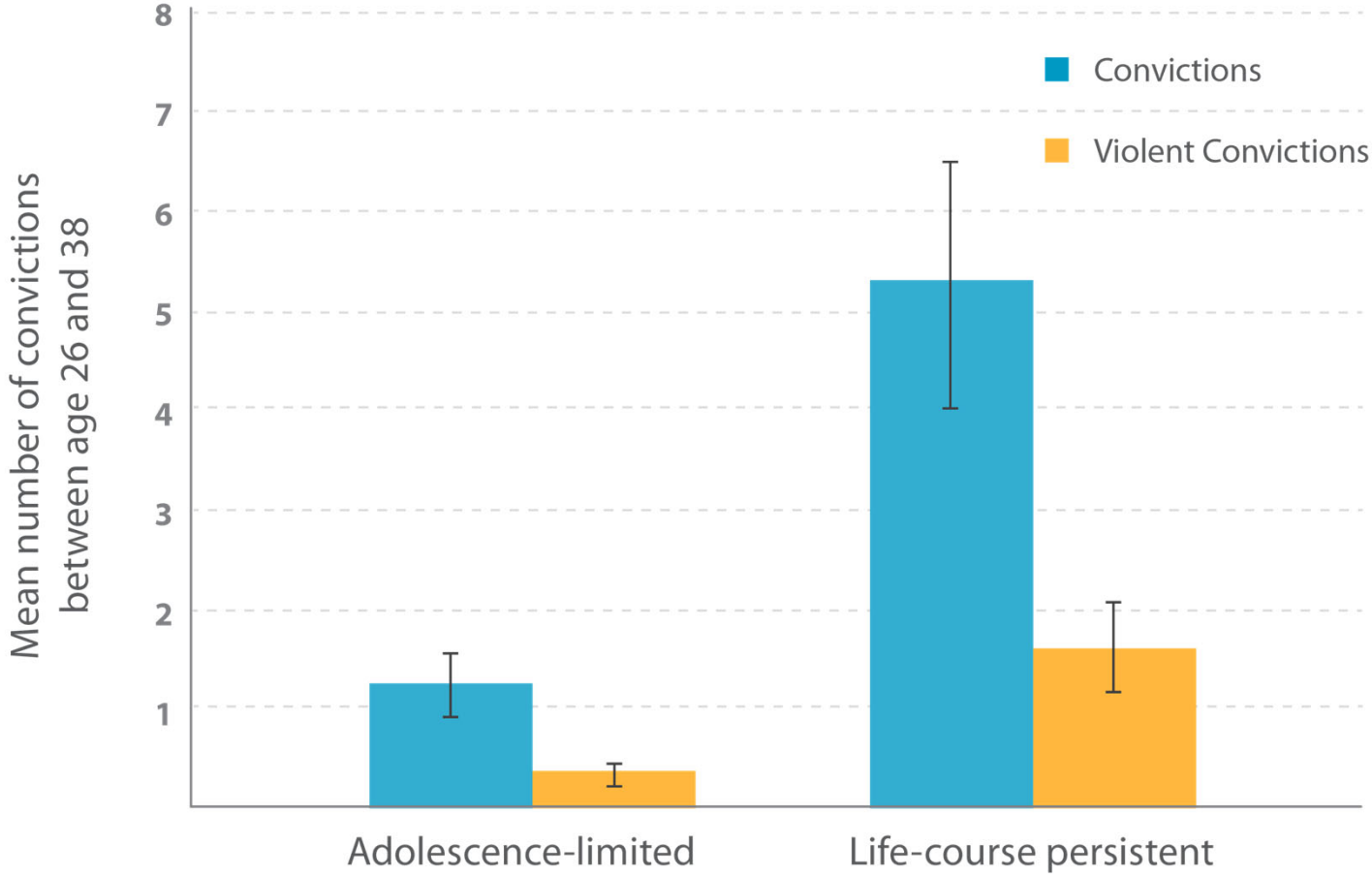
Ages 32, 38, 45

After age 26, Adolescence-limited & Life-course persistent have continued to diverge on criminal convictions.



Moffitt, 2018, Nature Human Behaviour

Biology and Crime: A heated debate

- Neurodevelopmental hypothesis in 1993
- But technology not available to test
- New data technologies 3 decades later
- Genome-wide genetics
- MRI Brain imaging

Research Article

Psychological Science
2018, Vol. 29(5) 791–803
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sagepub.com/journalsPermissions.nav
DOI: 10.1177/0956797617744542
www.psychologicalscience.org/PS

Genetics and Crime: Integrating New Genomic Discoveries Into Psychological Research About Antisocial Behavior

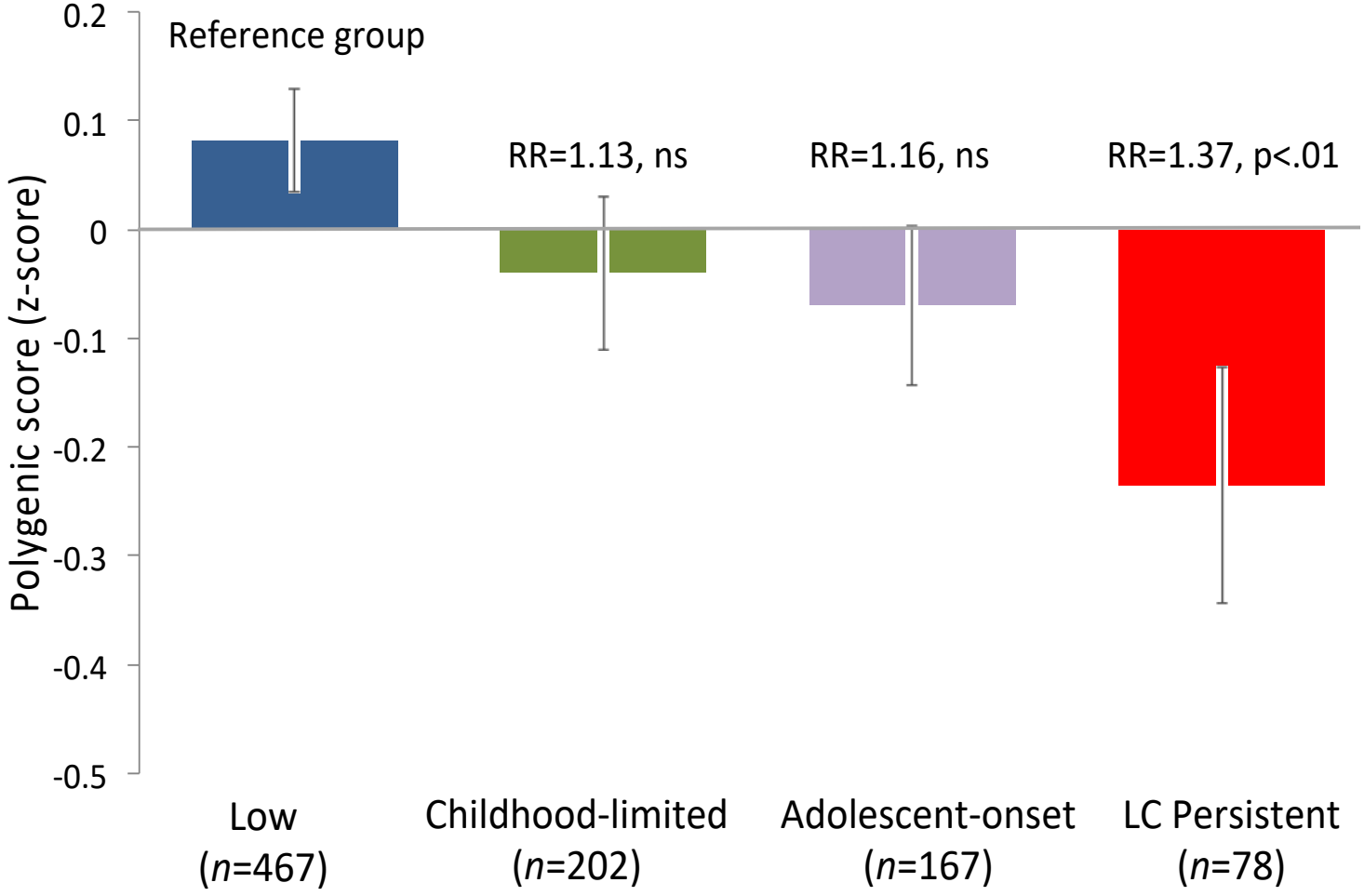
J. Wertz[1], A. Caspi[1,2,3,4], D. W. Belsky[5,6], A. L. Beckley[1,7], L. Arseneault[4], J. C. Barnes[8], D. L. Corcoran[3], S. Hogan[9], R. M. Houts[1], N. Morgan[10], C. L. Odgers[11], J. A. Prinz[3], K. Sugden[1], B. S. Williams[1], R. Poulton[9], and T. E. Moffitt[1,2,3,4]

[1]Department of Psychology & Neuroscience, Duke University; [2]Department of Psychiatry & Behavioral Sciences, Duke University School of Medicine; [3]Center for Genomic and Computational Biology, Duke University; [4]Social, Genetic, & Developmental Psychiatry Research Centre, Institute of Psychiatry, Psychology, & Neuroscience, King's College London; [5]Department of Medicine, Duke University School of Medicine; [6]Social Science Research Institute, Duke University; [7]Demography Unit, Department of Sociology, Stockholm University; [8]School of Criminal Justice, University of Cincinnati; [9]Dunedin Multidisciplinary Health and Development Research Unit, Department of Psychology, University of Otago; [10]Home Office, London, United Kingdom; and [11]Sanford School of Public Policy, Duke University

What is the education polygenic score?

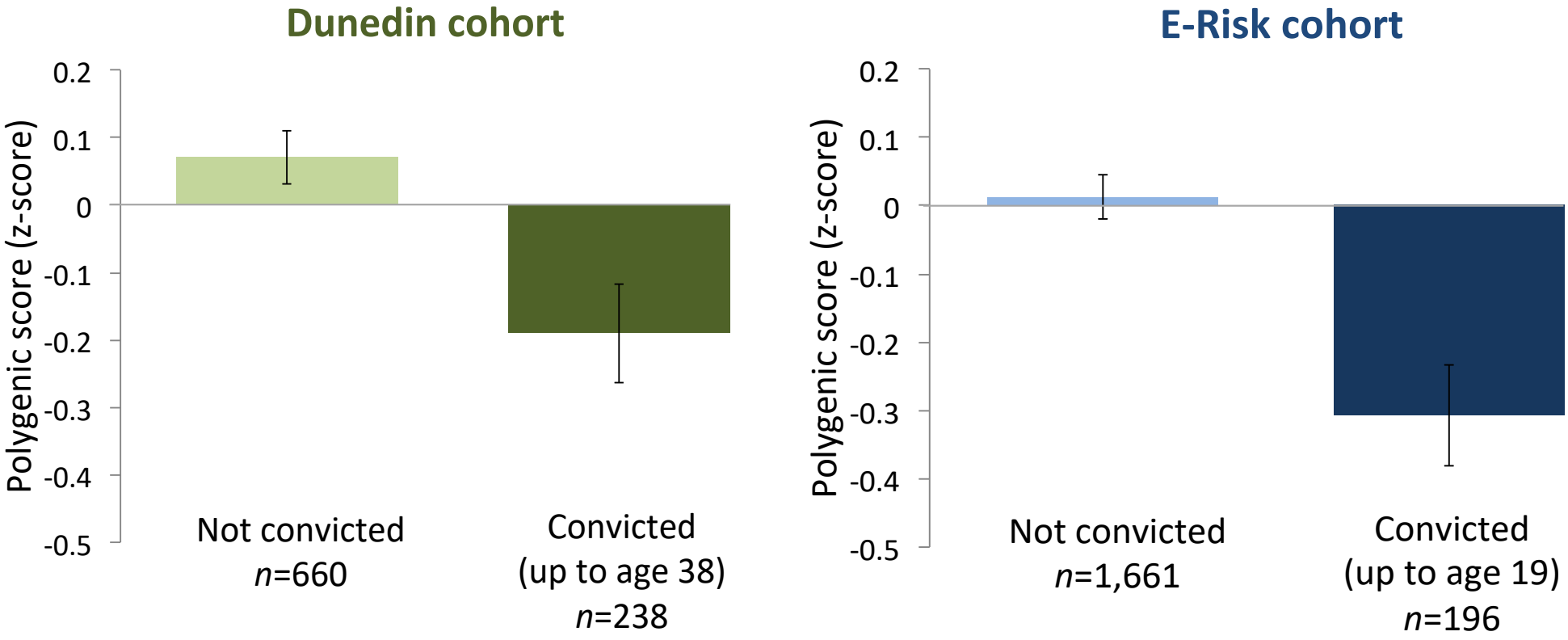
- 1 million people provided their DNA
- Stated their level of education
- GWAS: whole genome is searched for markers that associate with levels of education, low to high
- Genetic markers summed to create the polygenic score for educational attainment
- Score taps intelligence, also self-control, attention
- We derived this score in each Dunedin Study member's DNA

Mean Educational Attainment polygenic score derived from GWAS of >1million, for Dunedin Study crime trajectory groups:



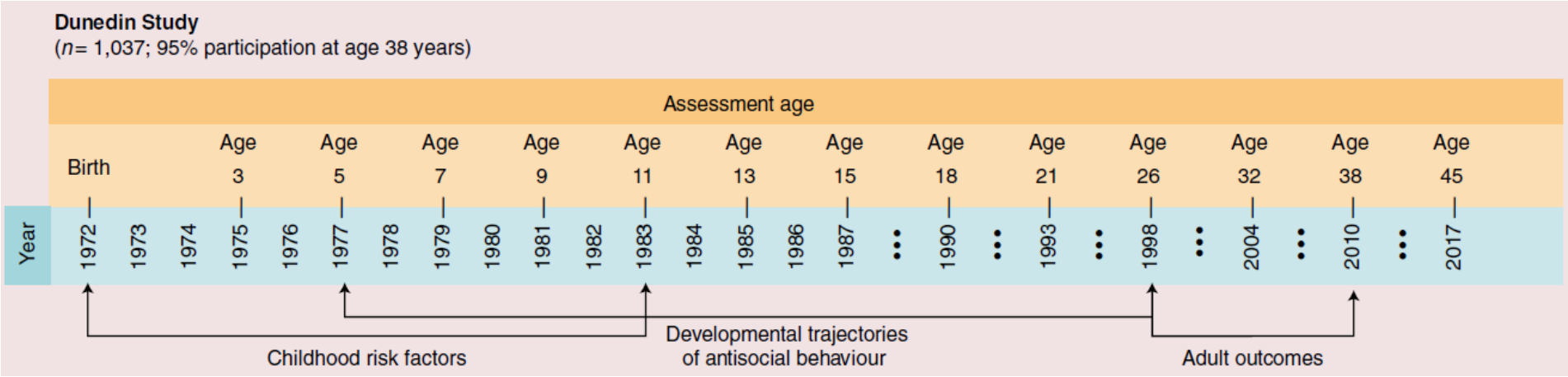

The Environmental Risk (E-Risk)
longitudinal study

Cross-cohort replication of mean education polygenic score by crime conviction



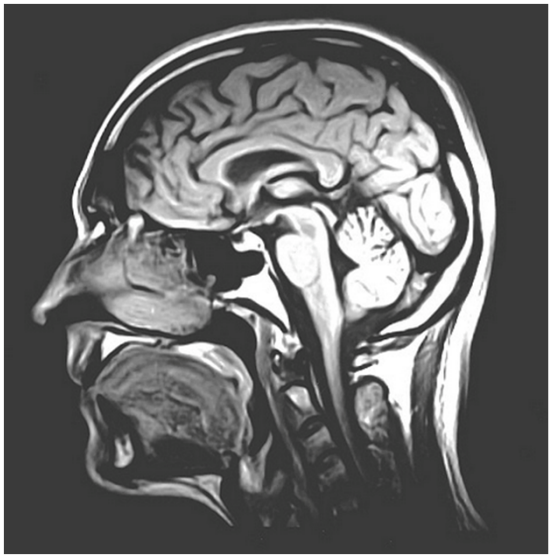
Wertz, Caspi, Moffitt, Psychological Science, 2018

Dunedin Study adds neuroimaging 2017-2019



Physical fighting
Bullying
Destroying property
Truancy
Stealing
Lying

MRI Brain scans

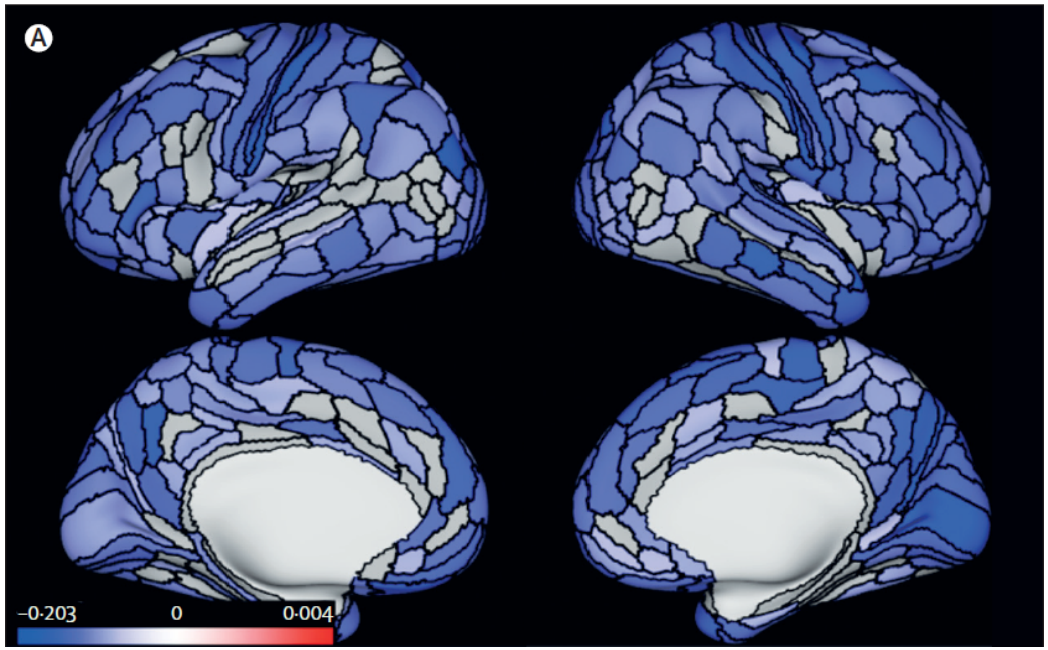


Brain's surface area at age 45

Blue = smaller surface area

Darker = bigger *group* differences

Life-course persistent had smaller surface area than low-antisocial



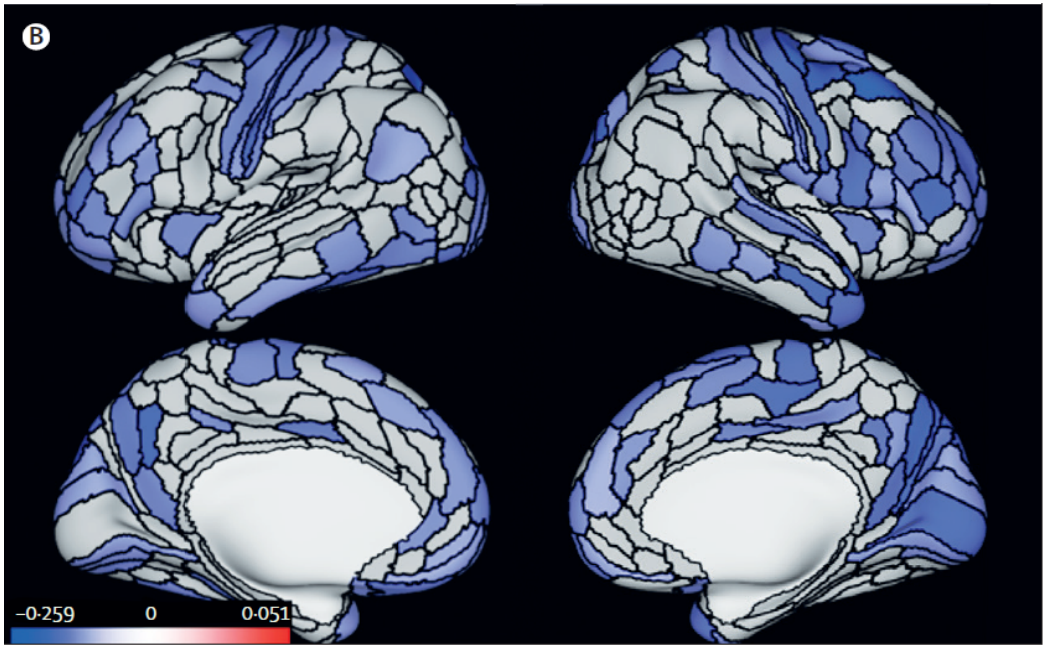
Carlisi, Caspi, Moffitt, et al. 2020, *Lancet Psychiatry*

Brain's surface area at age 45

Blue = smaller surface area

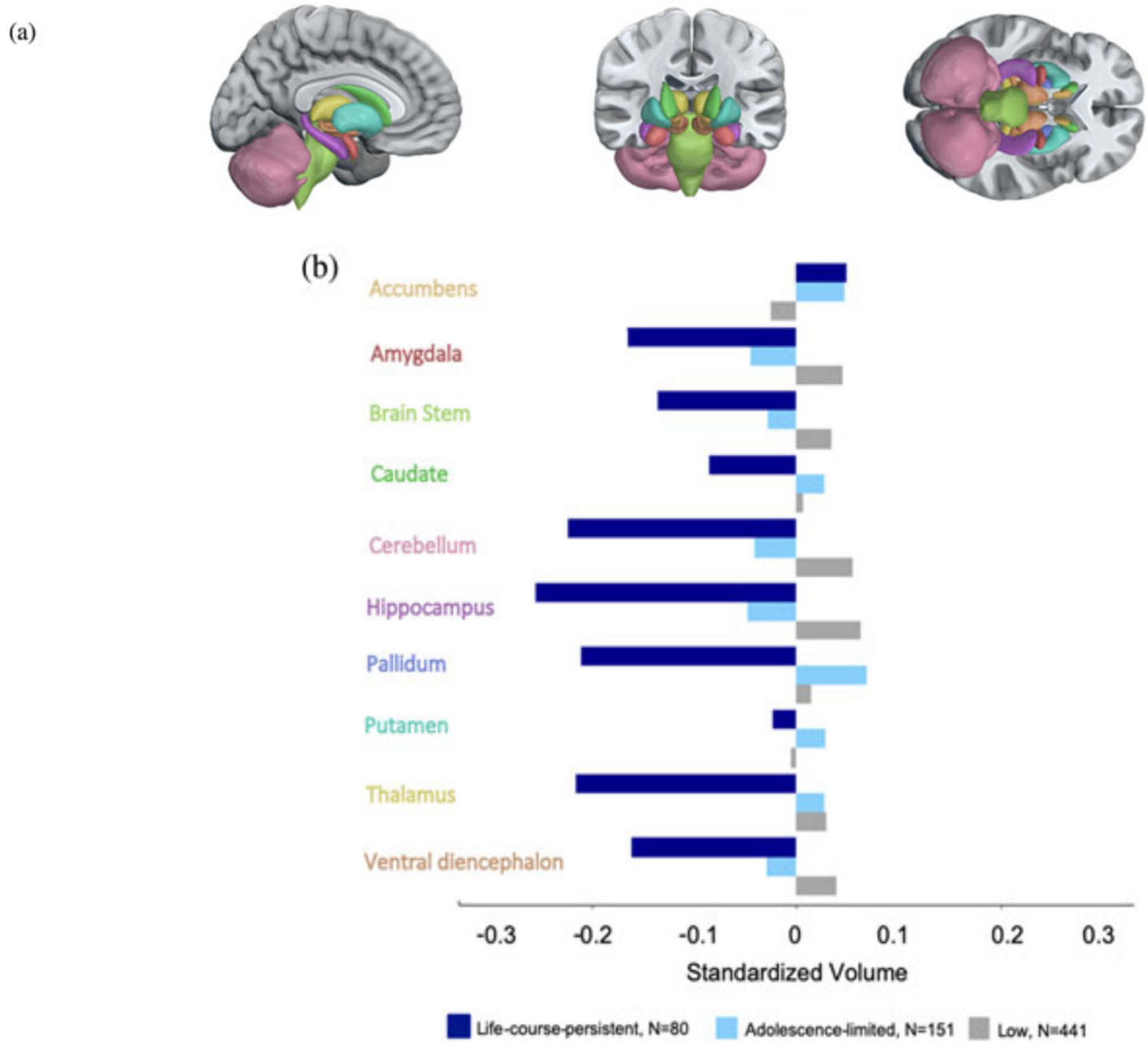
Darker = bigger *group* differences

Life-course persistent also had smaller surface area than adolescence-limited



Adolescent-limited did not differ from low-antisocial group

Brain's subcortical gray-matter volumes were smaller in Life-course Persistent group



Genetics and Adult Brain Structure

- Only the small *minority* of offenders who showed antisocial behaviour throughout their lives, from childhood well into adulthood, had any differences in genetics or in brain structure.
- The *majority* of offenders who break the law as young people *do not*.

LCP are doing less crime in midlife, should we still worry about them?

An antisocial lifestyle may have biological consequences

Studying aging outcomes….

Control for history of tobacco smoking.

Control for health measures in childhood, to test for decline from a youthful peak of health.

3-D Facial photography at Phase 45 in Dunedin

These Dunedin cohort members are 45 years old

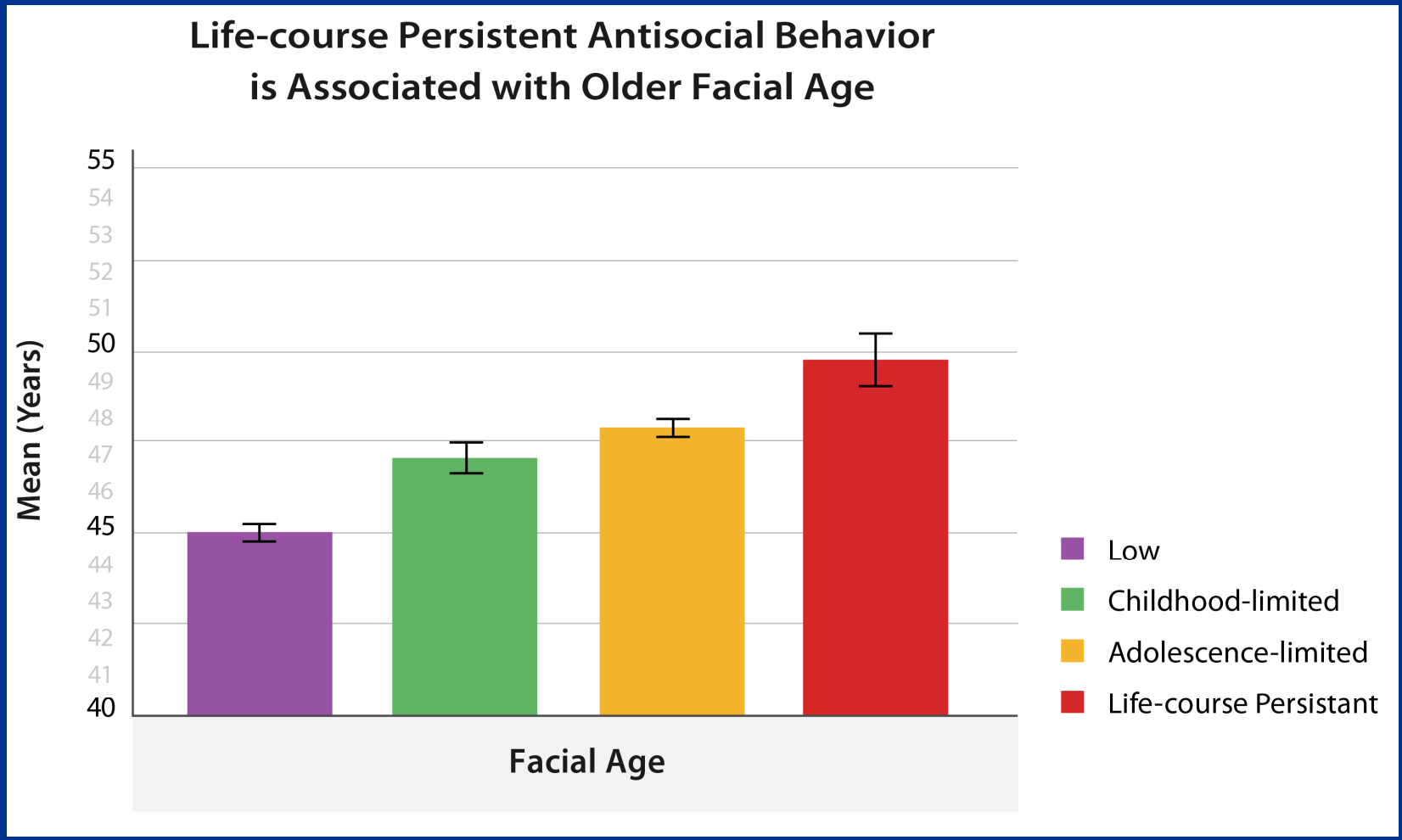
Composites of 10 Dunedin Study cohort members, all born 1972.

Each composite is created from 10 faces with Psychomorph.

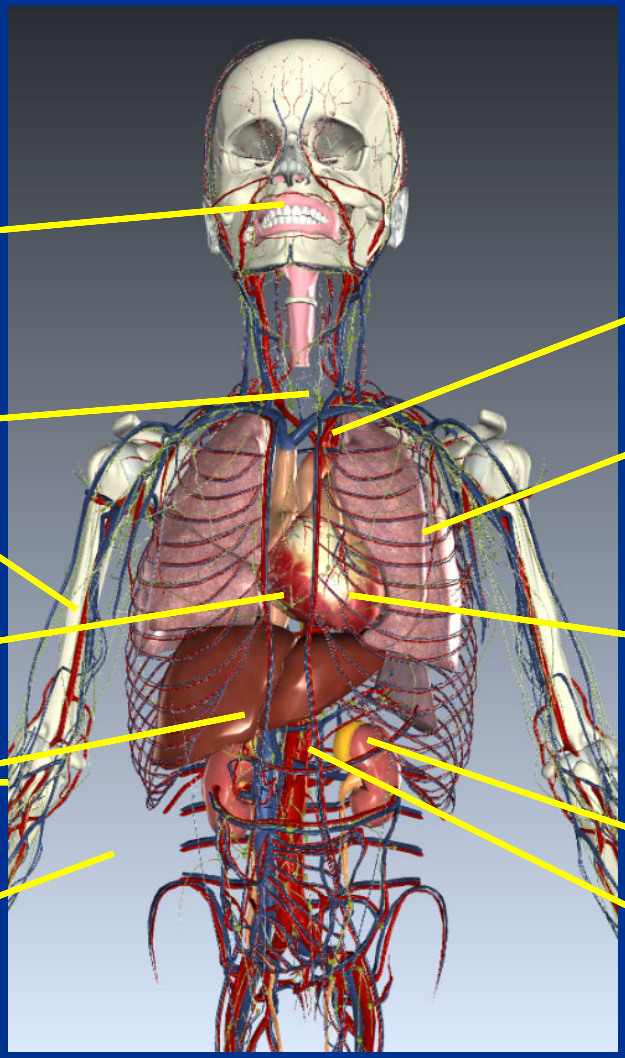
These cohort members are 45 years old too

Fastest-aging 10
Dunedin Study
Cohort women
and men

Elliott, Caspi… and Moffitt, *Nature Aging*, 2021


Life-course Persistent Antisocial Behavior
is Associated with Older Facial Age
Mean (Years)
55
54
53
52
51
50
49
48
47
46
45
44
43
42
41
40
Facial Age
Low
Childhood-limited
Adolescence-limited
Life-course Persistant

19 biomarkers track coordinated physiological deterioration: age 26, 32, 38, 45 years



Gum health,
Tooth decay

Leukocyte count,
C-Reactive Protein

Cardiorespiratory Fitness

Creatinine, Urea Nitrogen

BMI, Waist-hip ratio

Mean arterial pressure

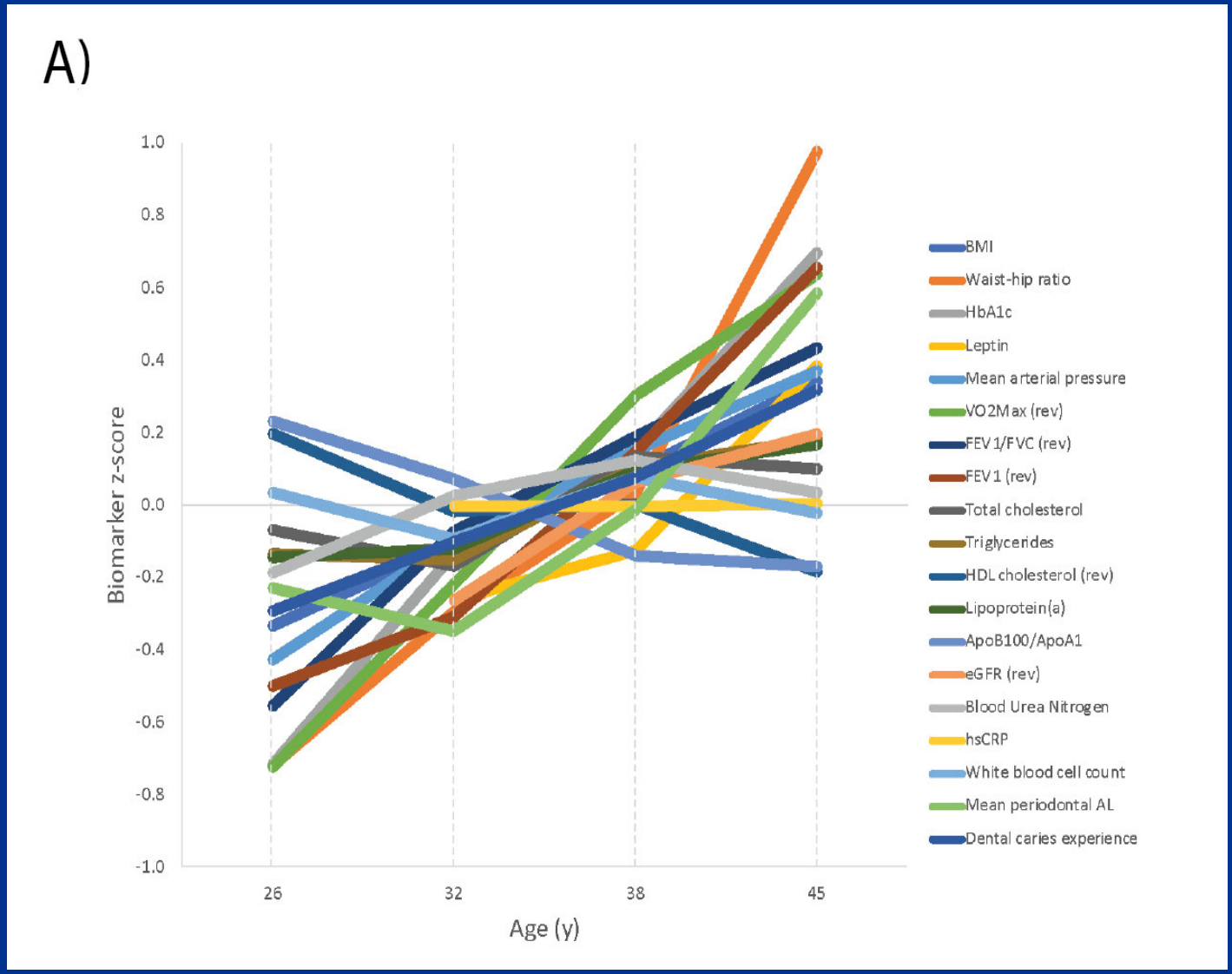
FEV1, FEV1/FVC

Total Cholesterol,
HDL, Triglycerides,
Lipoprotein(a),
ApoB100/ApoA1

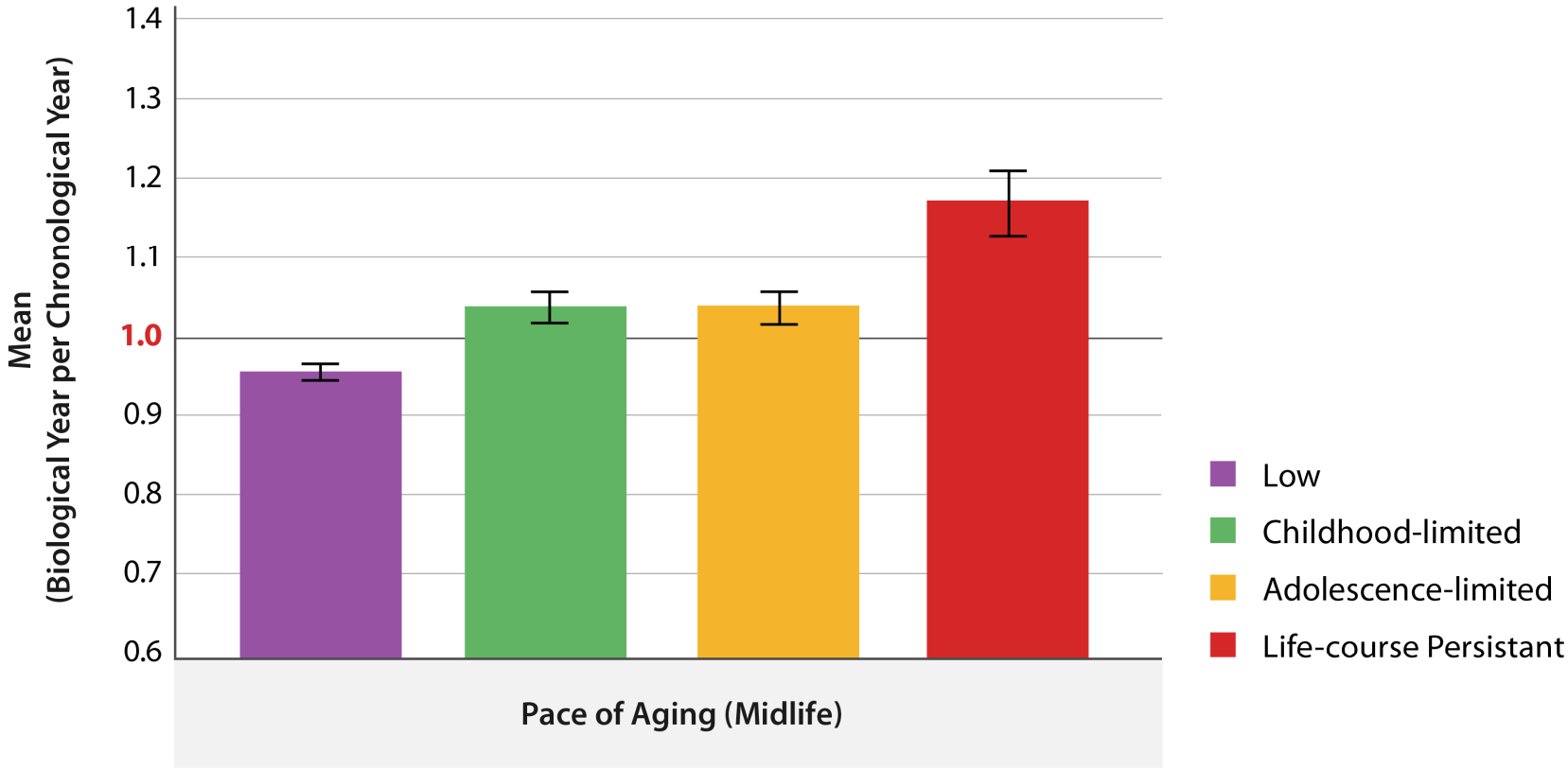
HbA1C

Leptin

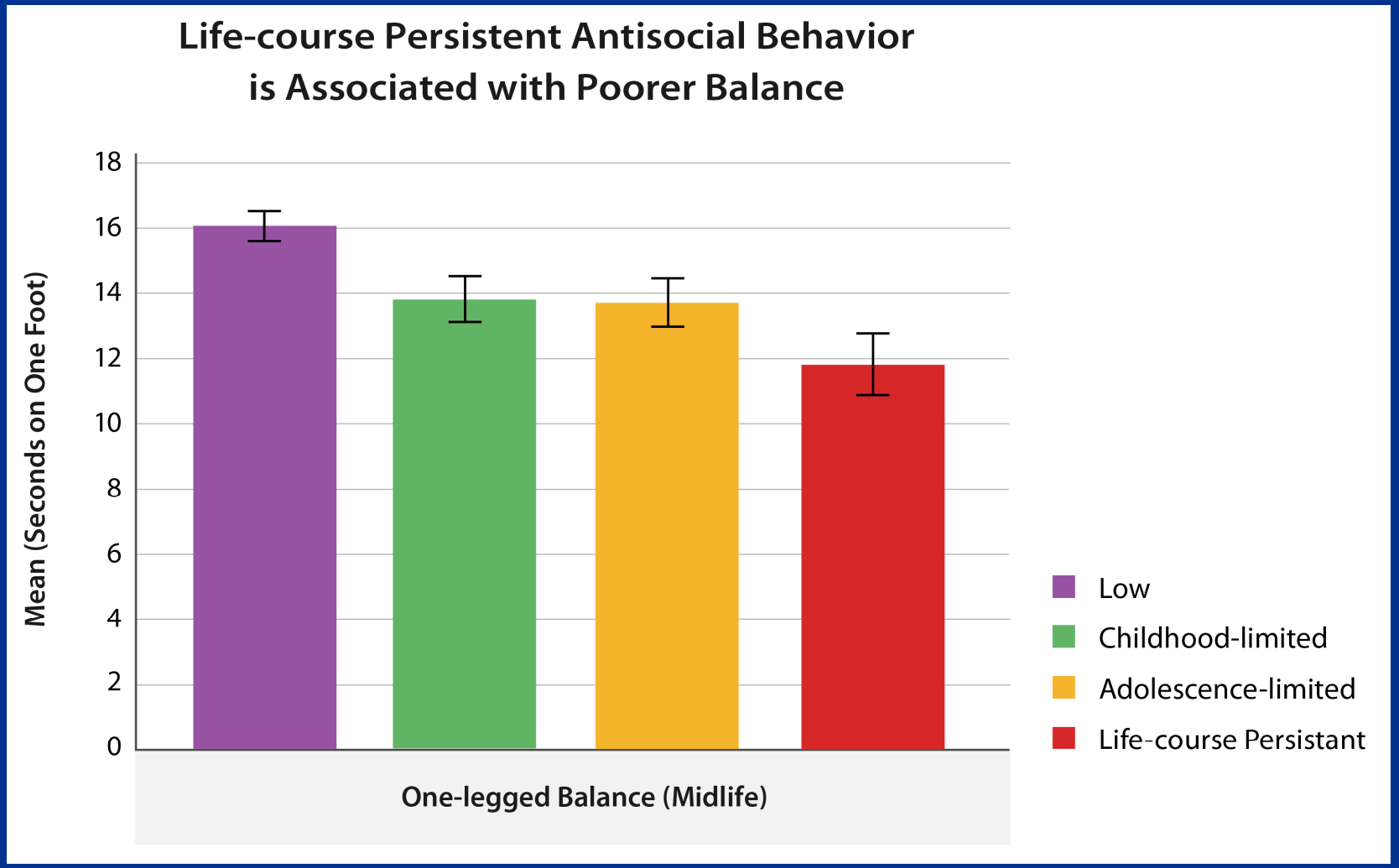
Biomarker Panel: Correlated Worsening in Physiological Integrity from Age 26 to 45

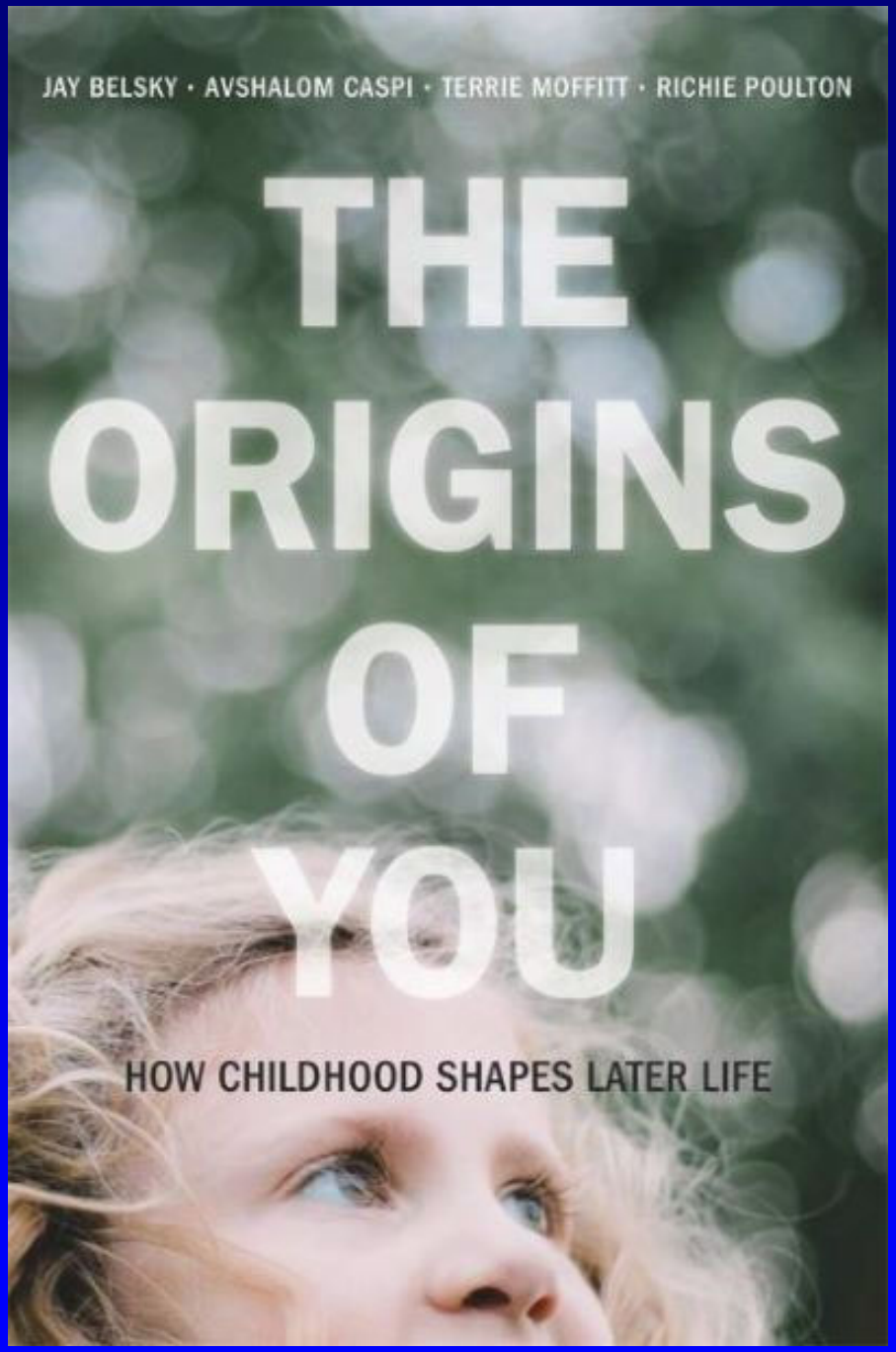


Life-course Persistent Antisocial Behavior is Associated with Accelerated Whole-body Pace of Aging



Physical function: one-leg balance


Life-course Persistent Antisocial Behavior
is Associated with Poorer Balance
Mean (Seconds on One Foot)
18
16
14
12
10
8
6
4
2
0
One-legged Balance (Midlife)
Low
Childhood-limited
Adolescence-limited
Life-course Persistant



Harvard University Press, 2020

Tests of the taxonomy by other research teams in 16 countries, and nonwhite ethnic groups

- Moffitt, T.E. (2006).
  In D. Cicchetti & D. Cohen. Developmental Psychopathology, 2nd edition.

- Moffitt, T.E. (2018).
  Nature Human Behaviour.

Implications for Prevention: Life-Course Persistent Offenders

- Half of the crime rate
- Small numbers, disproportionate societal costs
- Early-childhood primary prevention
- Public-health approaches to reduce infant neuro-developmental problems
- Multimodal approach: child, family, school, justice system
- A chronic cumulative condition needs life- long sustained intervention

Implications for Prevention: Adolescence-Limited Offenders

- Other half of the crime rate
- Good candidates for positive change
- Healthy attachment bonds and good school achievement
- Stop deviant peer influences on them
- Prevent “snares” that may retard natural desistence: addictions, lost education, an official conviction record
- Diversion to give them a chance to reform

IMPACT

- Difficult to trace provenance of an idea
- Real-world impact from science takes 17 years on average
- Once a finding is used, policy makers stop crediting the original publications

“For improving the lives of young people in conflict with the law around the world”

2018 award
International
Juvenile
Justice
Observatory

IMPACT

- Hard for researchers to control use
- US Supreme court decisions:
- Death penalty for violent juveniles 2004
- Life without parole for juveniles 2009, 2017
- The 1993 theory was invoked to argue **both sides**

No. 03-633

IN THE

upreme Court of the United States

DONALD P. ROPER, Superintendent,
Potosi Correctional Center,

Petitio

v.

CHRISTOPHER SIMMONS,

Respon

RIT OF CERTIORARI TO THE SUPREME COURT OF MISSO

GRAINS?

ST. LOUIS POST-DISPATCH

Court bars juvenile executions

A LOCAL CASE YIELDS A LANDMARK DECISION • 72 DEATH SENTENCES ARE THROWN OUT

THE SUPREME COURT'S DECISION

MIXED REACTIONS IN ST. LOUIS

2 April, 2022

Dear Professor Moffitt,

Your research helped me make the most difficult decision that I have faced in my 20 years on the bench: whether to sentence a 16-year-old to life without parole. The central issue was whether his youth should be considered in mitigation…I simply offer my thanks.

XXXXX XXXXX,
Justice of the State Supreme Court

Duke
UNIVERSITY

Institute of Psychiatry at The Maudsley
KING'S College LONDON

UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND
SAPERE AUDE